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## ILLINOIS MEDICAL JOURNAL

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## Editorials

### MICHAEL DAVIS SCORES ONE FOR THE NEEDS OF MATERIA MEDICA TO TEN FOR CORPORATIONS PRACTICING MEDICINE

That famous sale into bondage of Joseph by his brethren was a mere prankish schoolboy swap in the light of what some of our professional brethren have made up their minds to do with the science of medicine.

If these misguided ones can't perpetrate the slave sale on one block, they are determined to do it on another.

Partial enslavement having been accomplished by lay handiwork in endowments, corporations practicing medicine, part pay clinics and bureaucratic blows from Washington, comes now another trick. This is destined, for all its soft mouthings, gentle music of clinking profits and sweet warm air of the trumpet that tells of green pastures far afield, to give medicine a lusty sock on the snout and at the same time delivering it hog-tied and bound into the hands of the quacks and Egyptians.

Medicine, God save the mark, falls into the trap with all the innocence of the youthful Joseph. Not until the cloak of many sacrifices and services is hawked in the trophy room of the destroyers, and quartered and parcelled out among the thieves, will the depth and strength of the outrage make itself evident. By that time it will be too late.

The latest siren voice to be heard in the wilderness of economic distress surrounding us is that of a misguided Moses crying out from the smugness of the Rosenwald foundation. Masking his arguments as a plea for better mutual understanding between the profession and media of publicity the gentleman scores one for the needs of materia medicine to about ten for those corporations practicing medicine whose opulent advertising proves that publicity as much as competition is the life of trade, if not of science and ethics.

It is a pretty raw thing to see medicine put on a trade basis.

Barter and sale do not, can not, will not go hand in hand with those humanities through which medicine has flourished and upon which it was founded. The Aesculapian doctrines, the Hippocratean oath have nothing to do with bargain sales, fire salvages, or turnover of stock.

Alas and alack! It is not a matter of money with the medical profession, albeit we must live, but of the very nature and essence of the life work of medicine's neophytes. That is the hair upon which medicine and medical imitators must ever split.

Truly the general public needs education in the matter of medical efficiency. Of that there is no doubt. With no criticism of the profession of publicists and advertising men, at the same time there is not a yard stick by which either medicine, the law or the church can be measured. These three elements in the life of modern civilization, dealing as they do with many of the abstract verities cannot be computed by the rule and the weight demanded by concrete elements. When you traffic in the human body that houses the immortal soul it is cheap business, inefficient business, yes, actually lying business to attempt to build your tables on the basis or even the ratio of the grocer, the clothier and the carpenter.

Now though Mr. Michael M. Davis, medical director of the Julius Rosenwald fund, evidently feels that the medical profession should play the sunflower rather than the violet by the mossy stone, certainly if Mr. Davis' advice were followed literally as was said at the first of this article, Joseph and his bondage would be free as the air compared with the pit into which the medical profession will have followed.

Probably Mr. Davis knows more about the ways of medicine than he does of advertising and paid publicity. Even so, the veriest tyro in public relations should realize that editorial ethics is as hidebound as that of medicine itself, and that there can be no compromise between space-paid-for publicity and that which emanates as editorial dicta.

The ethical newspaper is as careful of its ethical editorial policy and holds it as much beyond price as is medical ethics, and as the American Medical Association itself. One is East, the other is West. Kipling was right—"Never the twain shall meet."

Existing differences between the organized medical profession and organized publishers over medical advertising are caused, according to Mr. Davis, "By a misunderstanding."

Well, of course that is what caused the world war. And it was just another misunderstanding that sold Joseph into Egypt.

But let Mr. Davis speak for himself:

### HEALTH EDUCATION IMPORTANT

"The education of the public in health matters and the extension of services which are essential to prevent or control diseases dangerous to the public health have become highly important," says Dr. Davis. "Policies and principles should be developed which will facilitate the use of modern methods of publicity for these purposes while also protecting professional standards.

"It is essential to draw the distinction between advertising for public health and advertising conducted with the aim of financial profit. Medical organizations whose codes of ethics now recognize public health advertising in principle should develop more specific policies appropriate to this field and discriminate these from the policies applicable to individual physicians and to advertising for commercial purposes.

### URGES BETTER UNDERSTANDING

"The organized medical profession on the one side, and editors, publishers and advertising agencies on the other, do not appear to have come into sufficient touch with one another to recognize each other's standards and attitudes. The publishing group seems to have regarded the medical code as unduly emphasizing the individual point of view and as having failed to take the public into consideration.

"The medical profession, as a body, has not been informed about the modern development of advertising, or as to the standards set by the best advertising media. Closer interrelation and mutual understanding between the two groups would be of mutual advantage."

Few medical bodies, we are sure, will accept Mr. Davis' theories without some tall arguing.

## NOT TOO LATE TO SAVE THE MEDICAL SHIP OF STATE

The medical ship of state, undergoing squally weather and outlandish gales, has every chance in the world to make port safe and sound by display of canny seamanship and courageous loyalty.

Canny seamanship right now means sticking by the ship and cargo and holding to the course.

The time honored lane for the ship of medicine to traverse is charted carefully.

There can be no dallying with the compass, no reefing of sails when full sail is indicated, and the bell rings for "straight ahead."

Right now, too, the rigging must be lashed tight and trim and no loose ends allowed to interfere.

Universally the world is in convulsion. A tidal wave of distress sweeps from axis to axis in the most unprecedented upheaval of civilization's history. What the medical profession must remember is that Aesculapius and Hippocrates started off the good ship medicine with the right sort of ballast, and—to stick to that ship.

A lot of that ballast was self respect for the profession; for the practitioner, and for humanity, and grew out of a most exalted ethical sense. First, last and always, the physician was a man of honor and honor was rendered to him, first, last and always.

What now of honor and honors? In these days of turmoil the average physician finds himself reduced almost to beggary. He has shot his bolts of sacrifice, of service and of honorable procedure into the midst of his fellows and finds only too often that not only is honor not his but that he is in danger of becoming an object of ridicule—colloquially "An easy mark." Unselfishness has been a bitter boomerang.

He must give of strength and skill and knowledge and be too proud to ask recompense, too wise to expect it. He must take payment how, when and *if* his patient cares to pay him. Like the fields and groves he must wait for the miracles of rain and snow to slake his thirsts.

Nor dare a doctor murmur in protest when the people whom he serves rise up and take from him his life work.

Yet all the lay-endowed institutions practicing medicine anywhere be they ever so rich and arrogant cannot take from the doctor his skill, his science, his wisdom, and his ideals.

So if the crew but stick together, hold on to the ballast and watch the chart, navigate as navigators should and watch out for the siren rocks of false promise and falser premise such as relief legislation that does not legislate, encroachment upon individual and professional rights and deprivation of a living wage for every physician—a wage commensurate with the pay of a corner grocer or of a mechanic's apprentice helper—the ship will be saved and make port with a golden cargo and to the undying good of civilization, and the humanities.

To be a "medical-politician" holds no opprobrium for those who realize that it is all for medicine and naught for politics that this campaigning is done. These doctors are out to help save the ship.

As a matter of fact a medical politician is really a pretty good fellow. In the strictest sense of the word a medical politician (and there exists wide difference between a medical politician and a politico-medico)—is a man sufficiently interested in the economies of medicine to let himself in for a lot of hard and extra work. These include such labor-laden honorariums as a man's permitting himself to be appointed a member of the legislative committee of his county medical society; to allow himself to be elected a member of the House of Delegates or of governing boards of his state or county medical society, or to accept membership in such bodies as the state board of registration, etc., etc., of medicine. Of course such work takes and always has taken the poor medical politician away from that select atmosphere of pure scientific research and disassociation from anything as mundane as money except when money came in gobs and gifts as to a king's favorite from endowed foundations and research funds. All very necessary in its way, *but* the entire profession can't dedicate itself to research and let itself walk the ways of erudition over ailing and wailing bodies of the dead and the dying.

So when old man slump unloosed the caves of the winds and sent depression gales flying hither and yon, a lot of those happy researchers who had sat on the heights refused to recognize the brotherly bond between himself, a

man who worked for fame—(albeit he sat on a plush divan while working)—and the poor devil who howled because he worked for humanity and had to have a few pence per diem—well, a lot of those who had been sitting on the heights were blown off, out into the cold and cruel sea of every day facts.

Have these "blow-aways" been yelling for lifeboats? Have they grabbed onto the life lines thrown out by the poor old medical-politicians who have been busy trying to keep the ship of medicine seaworthy, calking up the leaks where reefs of cash-through-lay-dictation and disguised socialistic tenets have ripped holes into the good old hulk? And trying to save the rigging and all the rest?

Indeed they have. For which let us all thank Heaven.

Not for the slump but for the fact that the "blow-aways" have been blasted out of their fool's paradises and palaces of Circe and now want to climb back on board ship with their fellows. And that way safety lies.

As they are being brought on board what do they ask of their rescuers?

"What has happened?" they ask. "Here I am as proficient and strong as I ever was, and I have discovered a lot and learned a lot and have just as big a practice but I have no income. What and why?"

The answer comes back from bridge and hatches, poop-deck and galley:

"You were too busy thinking of yourself to think of the mother science. Too busy 'researching' and getting your plush cushions to realize that after all nature is raw and medicine goes hand in hand with nature. Too much engrossed on your heights to bother about protection and preservation of the science and practice of medicine and failing to do a little research and a little defensive work in that quarter so that state medicine and socialistic practices could be kept from making fatal inroads on the practice of medicine so that the average conscientious practitioner must be endowed if he is going to keep alive to practice and to eat while he practices."

The gods are to be thanked, let it be repeated, that these awakened ones are slowly beginning to realize the debt they owe these pioneers at whose efforts to stop the socialization of medicine, they have turned a sneer and thumbed the nose. They have not shared in this burden, and yet they have been reaping benefits undeserved and far greater than those harvested by the "medical-politicians" who were not afraid to get out into the thick of the mess and to fight fire with fire, politics with politics for the sake of preserving the medical profession and its glories.

This knowledge is fetching to the hearts of the *men among men* among the rescued, an arrant sense of shame. Sincere in their apologetic murmurs, that sincerity must be accepted even if ignorance of the emergency is as culpable as ignorance of the law. If they wish to make amends (these prodigals) and the most of them do—the method is easy. Let them man the ship, take the wheel, stand watch, and so let those who have dared not close an eye get temporary well earned rest. For the reefs and shoals grow more perilous as the harbor nears.

The Ship-of-Medicine is battling the gales with decks awash; much rigging lost and crippled engines. What fitter time then, than this, for the rescued prodigals to turn in, man the pumps and through unity of purpose and action help the bark make harbor?

The crisis is here, but the day is not lost. Like a mother, torn and wracked by frightful convulsions, the ship of medicine is fighting for life and the right to live and serve faithfully her nearest and dearest—the children of men, the humanities of life.

This storm was long ago forecast by pioneer "medical-politicians"—those physicians with the gift of vision who strove alone and unaided to bring the ship to port. Those critics who scoffed have come to beg succor. And succor has been given in as much as it could be given. In return, the plea of the pioneers is "all hands to the pumps."

Let no one man of medicine turn a deaf ear to the call and so, when the harbor is gained find himself an outcast in his own heart even if he escapes open opprobrium from the tongues of men.

Save the ship. It can be done. But the man power is needed NOW.

## THE ST. CLAIR COUNTY MEDICAL SOCIETY CONDEMNS RAY LYMAN WILBUR FOR ATTEMPTING TO FORCE STATE MEDICINE UPON THE PROFESSION

At the June, 1932, meeting of the St. Clair County Medical Society the attention of the members of the Society was called to certain newspaper statements of Dr. R. Lyman Wilbur, which were thought to be derogatory to the members of the medical profession. The Society appointed a committee to investigate these published utterances of the aforesaid Dr. R. Lyman Wilbur and make such recommendations to the Illinois State Medical Society as they think justifiable.

The committee carefully reviewed a number of articles in various publications; (a list given at the conclusion of this report credited to Dr. R. Lyman Wilbur, and not denied by him as his utterances.)

This review shows very conclusively that the author advocates either knowingly or unknowingly, state medicine; and further severely condemns the profession in the manner of caring for the sick; especially of poor and middle class. Many of these statements to the public indicate that the profession in its various specialties are demanding undue fees for the amount of service given. Now inasmuch as all such statements and assertions are untrue and not made in good faith and are disloyal to the profession, and whereas these statements have a great influence in breaking down the relationship existing between the doctor and patient and creating distrust in the mind of the layman; an impression decidedly unfavorable to as honorable a profession as the world has ever known.

And whereas the position of the author of said assertions is such as to create confidence in the layman that he, as past president of the American Medical Association, President of one of the great American Universities and a Cabinet Officer in the government, and in all publications these titles are emphasized, his assertions become more odious; now, therefore, we the committee earnestly recommend to the Illinois Medical Society such actions as they deem suitable be taken; and we further recommend the State Soceity report to the American Medical Association and urge that body to take proper action as they deem suitable in the case.

H. A. Cables, M.D.
R. F. Stanton, M.D.
C. E. Hill, M.D.
G. C. Otrich, M.D.
C. S. Wilson, M.D.
John C. Gunn, M. D.

The following references are the basis of the above resolution:

Medical Progress in an Economic World, Ray Lyman Wilbur, M.D., President, Stanford University (address before the 1928 annual meeting of the California State Medical Association).

The High Cost of Health—*Literary Digest,* June 30, 1928. (Remarks of Dr. Wilbur on behalf of Committee on Cost of Medical Care.)

R. L. Wilbur Lays Big Doctor Bills to School Cost—*Chicago Tribune,* Feb. 19, 1929. (Remarks of Dr. Wilbur while presiding at session of Congress on Medical Education, Medical Licensure and Hospitals at Chicago.)

The Relationship of Medical Education to the Cost of Medical Care—Ray Lyman Wilbur, M.D., Secretary of the Interior. (Address given at Congress on Medical Education, Medical Licensure and Hospitals, Chicago, Feb. 18, 19, 20, 1929.) Reprinted from Proceedings of the Congress.

Millions Need Medical Care, Says Wilbur—*Chicago Evening Journal,* May 27, 1929. (Quotes from remarks made by Dr. Wilbur at semi-annual meeting of committee on Cost of Medical Care.)

Leaving It to the Doctors—*Chicago Tribune,* July 16, 1929. (Editorial commenting on remarks made by Dr. Wilbur at Convention of American Medical Association.)

Problem of Medical Cost, Ray Lyman Wilbur, M.D., Secretary of the Interior—*Chronicle,* Gardner, Ill., Aug. 15, 1929. (Comments on five-year program of Committee on Cost of Medical Care.)

Wilbur Urges Best of Medical Help for All—*Chicago Evening Post,* Oct. 22, 1929. (Reporting remarks of Dr. Wilbur at dedicatory exercises of new Medical Building at University of Virginia.)

Medicine in Servce, Ray Lyman Wilbur, M.D. (Address at dedication exercises of new Medical Building, University of Virginia, Oct. 22, 1929.) *Journal of the American Medical Association,* Nov. 30, 1929.

Extend Healing to All, Wilbur Warns Physicians—*Chicago Herald Examiner,* Oct. 23, 1929. (Quotes from remarks of Dr. Wilbur at dedication exercises of new Medical Building at University of Virginia, Oct. 22, 1929.)

The First Three Years' Work of the Committee on the Costs of Medical Care and Its Plans for the Future, Ray Lyman Wilbur, M.D. (Address at Committee's Spring Meeting, 1930.)

Under Group Practice the Cost of Medical Care is Likely to Be Increased, *Illinois Medical Journal,* Sept., 1931. (Quotes statement of Dr. Wilbur appearing in *Public Ledger* (Phila.) under date of March 22, 1931.)

Doctors Talk Economics, *Chicago Evening American*, Feb. 15, 1932. (Quotes from remarks of Dr. Wilbur at session of Congress on Medical Education, Medical Licensure and Hospitals, Chicago.)

U. S. Activities Peril Doctors, Warns Wilbur, *Chicago Herald Examiner*, Feb. 16, 1932. (Quotes from address of Dr. Wilbur at session of Congress on Medical Education, Medical Licensure and Hospitals, Chicago.)

Doctors Dispute Business as Aid to Profession, *Chicago Tribune*, Feb. 16, 1932. (Remarks of Dr. Wilbur at session of Congress on Medical Education, Medical Licensure and Hospitals, Chicago.)

Public Sharing of All Doctor Bills Urged by Wilbur, *St. Louis Star*, March 18, 1932. (Remarks of Dr. Wilbur at luncheon with newspaper men at Bankers' Club, New York City, March 17, 1932.)

Organized Medical Care Urged to Aid Persons of Low Income, *United States Daily*, March 19, 1932. (Quotes from address by Dr. Wilbur before representatives of Milbank Memorial Fund at New York City, March 18, 1932.)

Health Taxes?—*Time*, March 28, 1932. (Commenting on Dr. Wilbur's report as chairman of Committee on Cost of Medical Care to be given in November, 1932.)

Medical Instruction Needs Reform, Says Secretary Wilbur, *United States Daily*, May 7, 1932. (Quotes from remarks by Dr. Wilbur before members of American Council on Education at meeting in Washington, D. C., May 6, 1932.)

Resolutions Adopted by St. Louis Medical Society May 3, 1932, *Bulletin of the St. Louis Medical Society*, May 27, 1932.

Economic Aspects of Medicine, *Chicago Daily News*, Feb. 17, 1932. (Editorial making slight reference to remarks of Dr. Wilbur at Congress on Medical Education, Medical Licensure and Hospitals, Chicago.)

Note: Several State medical journals have taken Dr. Wilbur to task because of his published statements and talks in which he advocates universal state and national care of the sick, for instance: The Journal of the Tennessee State Medical Association, April, 1932, speaking of Dr. Ray Lyman Wilbur and the committee on the cost of medical care concludes a two page editorial with the following:

"Organized medicine has contributed something to the present prominence of the chairman of the committee on the cost of medical care. Was an error made?"

Southern Medicine and Surgery, September, 1932, in a two and a half page editorial "Doctors Should Resume Leadership in Scientific, Civil and Political Affairs," quotes the action of the St. Louis County Medical Society winds up the article in the following language:

"In whatever Dr. Wilbur has to say in condemnation of practitioners of medicine, honesty would require that he make it unmistakably plain that his pronouncement is no confession of an eminent practitioner of medicine, but the expression of opinion of an outsider.

"Manifestly, the St. Louis Medical Society's members are not abashed by high office. Most likely they hold less indulgence should be exercised toward those positions of power and honor toward lesser folks. Medicine has suffered much, and needlessly, from failure to call the high-and-mighty to strict account."

Medical Times, October, 1932, in an editorial "The Washington Merry go round" concludes its editorial in the following:

"The last utterances of Wilbur is of a piece with his recent remarks upon the benefits of the depression in childhood."

An administration that speaks in such banal, inept and intellectually bankrupt voices cannot commend the respect of the civilized element in this country.

It is useless to multiply instances of similar character. Numerous Medical Journal quotations condemning Dr. Wilbur could be cited.

## ST. LOUIS MEDICAL SOCIETY CRITICIZES DR. RAY LYMAN WILBUR

At the May 3d, 1932, meeting of the St. Louis Medical Society the following resolution was adopted:

WHEREAS, it has been a matter of common observation and knowledge, during the past year or two or more, that there have appeared in the daily press several articles or addresses credited to Dr. Ray Lyman Wilbur, and that in no instance, so far as known, has either responsibility or authorship been denied by him, and that these specific articles have been characterized by statements very frankly adversely reflecting upon the professional integrity of the Medical Profession, upon its maintenance of technical skill and knowledge, upon its conversance with the progress of Science in general, of Medicine in particular. It has been very frankly and repeatedly charged by him that the Medical Profession is censurably obsolete in its current concept, in its current policies, in its current visualization of the things of today, in its current interrelationships with the citizenry in general, in particular in its current execution of the trust imposed upon it by the Commonwealth regarding all matters that directly or indirectly are involved in the complex problem of the maintenance of the health of the citizenry. It has been charged by him that the citizenry has been, and is being, denied proper medical and surgical skill and care, and that, for that which it receives, it is being greatly and unjustly overcharged. It has been charged by him that the Medical Profession views with lethargic indifference its own very obvious delinquencies, inadequacies, and neglects—that it views with active antagonism any far reaching constructive readjustments of

either training or practice that will tend to coordinate Medicine more effectively with the tempo of the current day, and with the probable pending future. It has been further charged by him not only that a traditional conservatism of this noblest of the ancient liberal Profession is directly opposed to any substantial liberalization of either concept, policy, or practice;—but also it has been specifically charged by him that "the rugged individualism of physicians" is one of the "chief obstacles to plans for providing adequate, reasonably priced medical service to Americans";—and

WHEREAS, Dr. Ray Lyman Wilbur, in these specific articles, that have appeared in the current press, urges in remedy for the existing order of things, that to his mind appear so gravely inadequate, so grossly censurable,—group practice, the wide assumption by the Commonwealth of the financial and professional responsibilities for the illnesses and the casualties of the individual, and yet further "the enactment of some sort of National legislation" of sufficiently far reaching and drastic elasticity that will wholly remove these various obstacles to which he adverts, and will establish in lieu thereof, in beneficent functionation a radically new and radically different order of things,—the which will inevitably fructify to the enormous and widespread betterment of the Commonwealth. Furthermore Dr. Ray Lyman Wilbur has specifically charged, as reported in the current press, that "the bulk of the medical profession opposes any plan which would make it difficult or impossible for any individual member to build up practices bringing in $100,000 a year or more, and so some sort of compulsion will be necessary";—and

WHEREAS, it would appear that the various charges, criticisms, and animadversions, that Dr. Ray Lyman Wilbur has assumed the privilege of having recorded, as his personal opinions, in the daily press, are not grounded on unimpeachable evidence;—that he assumes the privilege to deny the right of the practitioner of Medicine to attain an income in excess of that which he arbitrarily is pleased to establish as, in his opinion, adequate for professional service, and that such limitation of financial recompense is nowhere prescribed, nor no such delimitation of personal endeavor enjoined, so far as known, in the precedent Bill of Rights, in the later Constitution of the United States, nor in that of any of the Component forty-eight States;—and that he conceives and endorses plans and policies of far reaching and drastic consequence to be assumed by the Commonwealth, and enforced under a system of laws never hitherto approved in these United States, repugnant alike to both the sound traditions, and the spirit of the historic citizen of these United States, and that such laws controlling such policies have in no other Nation demonstrated either a beneficent efficiency or a constructive progress consonant with the standards and the ideals of a free citizenry, and furthermore, that he proposes and endorses "compulsion" in the execution of his plans and policies, which are in their essence Socialistic in nature, disruptive to the manliness of a freeman, and are concretely demonstrating their pernicious and enervating activations in such countries as Great Britain, Germany, Austria, during these current days;—and

WHEREAS, it would appear that even if all that Dr. Ray Lyman Wilbur arbitrarily maintains be correct, and that the Medical Profes sion stands attaint of lethargic indifference, of grave delinquencies, and of unpardonable infidelity, to the Commonwealth in which it functions;—even so, there yet remains not the slightest ground of justice, nor of good taste, nor of ethical propriety, upon which he may, at his unrestrained pleasure,—and pending indubitable substantiation of his wholesale destructive charges against the Profession of Medicine in these United States,—exploit his personal destructive criticisms in the public press, widely disseminate that which inevitably will rob the Profession of Medicine of the well deserved respect and the abundantly earned confidence of the community, that which if forced to its legitimate conclusion will reduce the lofty Profession of Medicine to that of an huckstering trade and, in general, will but multiply the protean difficulties, and extend the lamentable chaos of the present extremely difficult days;—and

WHEREAS, if the foregoing precis be correct, or even approximately correct, it is held by The St. Louis Medical Society, a component of The Missouri State Medical Association, itself a component of The American Medical Association, that these disruptive and destructive pub-

lic utterances of Dr. Ray Lyman Wilbur are disharmonious with The Principles of Medical Ethics officially sponsored and upheld by the American Medical Association;—nor is his current policy of public denunciation of, and public criticism of, the Medical Profession held to be in harmony with either the best thought, the best traditions, or the well known ethical restraints that are normally and generally assumed by each member of the Profession, and are commonly superimposed as the official controls under which each member of the Profession may be held accountable;—be it therefore

*Resolved,* that the entire matter of these public sayings of Dr. Ray Lyman Wilbur, in destructive criticism of the Medical Profession of these United States (of which the clipping from the *St. Louis Star,* of March 18, 1932, is submitted as a recent and a concrete document in evidence) be referred to The Chairman of The Judicial Council of The American Medical Association with the request for a thorough and an impartial investigation of the facts;—and be it further

*Resolved,* that if it be determined by The Judicial Council that Dr. Ray Lyman Wilbur has been guilty of unethical conduct in his public behaviorism toward the Profession that has so highly honored him and to which, so long as he is a component member, he owes unswerving allegiance;—or if it be found that Dr. Ray Lyman Wilbur is sponsoring, here in these United States, medical concepts and policies, and governmental enactments, that are essentially Socialistic, or otherwise destructive in scope, inimical to either the individualism, or the independence, or the integrity of the American freeman;—upon which the solidarity of these United States was founded, and upon which its noble progress has been so abundantly justified, it is herewith requested of The Judicial Council of The American Medical Association that appropriate disciplinary action be promptly exercised upon the offender;—and be it further

*Resolved,* that The Chairman of The Judicial Council be requested to forward to the Secretary of The St. Louis Medical Society a copy of its complete findings and of its complete actions, in the matter herewith submitted. Carried.

## HERE IS A GLAD HAND FOR THE HARASSED MEDICAL MAN

Out of the home of William Penn and Benjamin Franklin comes wisdom in the lay press worthy of Poor Richard's Almanac.

It deserves quotation at length and here it is. This golden encomium appeared originally on the editorial page of the October 6 issue of *"Every Evening"* of Wilmington, Del.

OUR DOCTORS—AN APPRECIATION

The Philadelphia Ledger declares that the Medical Society of that county estimates that in free services (and forgotten bills) it contributes $10,000,000 to the indigent sick or those who "neglect" to compensate the medical fraternity for treatment. This is in addition to the enormous amount of work done in hospitals and dispensaries.

The medical profession of our country have by no means escaped their full responsibility in relation to the prevailing depression and perhaps have aided to a greater percentage than almost any of the other callings. We are confident that our own doctors are not deaf to a single plea of patients and those of our citizens needing medical attention, because there was no compensating fee in sight or even in prospect.

Every Evening notes this reflected light on the invaluable services in such an emergency as has come upon us, simply for the purpose of informing the community that the contributions of the doctors of Wilmington are perhaps greater, in relation to their incomes, than that of any other class of citizens.

We have yet to hear of a single instance where a Wilmington physician refused his services because of the poverty of the ailing, but personally we know of our medical practitioners responding first to the urgent call of an indigent sufferer even while less severely afflicted, well-to-do patients waited.

Such service counts big and most worthily in a period like the present when so many of our people are without money and who might suffer severely but for our generous healers of their ills.

Even in more prosperous times our doctors give freely of their skill to those unable to pay —and, too, for many who are, but who do not habitually pay their doctor bills. Just now their incomes are as much reduced for the

reason that there apparently is less physical ailment than usual, and because the sick turn more to other sources of healing.

Doctors, however, are contributing their skill generously to those who are without means, but perhaps like the doctors of other cities may object to gratuitously treating people who have money and will not part with it if possible to keep their pockets closed against such claims.

Our medical men have given generously, indeed, to those in need and if their names do not appear large on cash contribution lists it is not to be thought that they are side-stepping their share of the community's responsibility.

## ILLINOIS HAS BEEN ALERT IN LEGISLATIVE PROTEST AGAINST CORPORATIONS PRACTICING MEDICINE

### THE BAR HAS DONE BETTER FOR ITSELF IN PROFESSIONAL PROTECTION

The justice of a law inhibiting corporations from practicing medicine has been up for demonstration more or less continuously before the legislative body of the State of Illinois by Illinois doctors for twelve years.

Few lines of legislation have been more urgent. None is more pressing now. Of no active economic condition are physicians more acutely aware.

Failure met repeated efforts to secure the desired legislation. This is not necessarily calamitous. The writer continues convinced that if legislation now on the statute books can be and is enforced that the laws already enacted are sufficient. As in many other instances it is enforcement of the existing statutes rather than the enactment of new laws that is indicated. And enforcement, there is the rub.

For several years this has been said repeatedly in the editorial columns of the ILLINOIS MEDICAL JOURNAL. Enforce the legislation we have now and stop the practice of medicine by corporations.

Among the active measures taken by doctors in Illinois to prevent corporate practice of medicine may be mentioned;—

Senate Bill No. 362 introduced in 1921 by the late Senator Wheeler;

Senate Bill No. 291 introduced in 1927 by Senator Mason;

Senate Bill No. 231 introduced in 1929 by Senator Searcy of Springfield.

Let us look to the fate of these bills.

Senate Bill No. 362 was tabled in the committee on Public Health and Hygiene. Remembered very well is this hearing in that a nationally prominent lawyer and a member of the Board of the Public Health Institute appeared in opposition to the bill. He became quite heated in his arguments against the bill and told the senators "that it did not make any difference to his organization whether they passed the bill because even if it became a law they would not pay any attention to it." He probably knew his committee for the Bill was tabled.

As to bill No. 291 we worked very hard on it and had it reported out favorably from the committee and it was on the third reading of the Senate before the opponents had it tabled.

As to bill No. 231 similiar to the preceding bills that Senator Searcy introduced this bill was also tabled in the committee.

For several years it has been the editor's intention that we do not need a law to deny corporations the right to practice medicine.

Emphasizing the statement that enforcement of current statutes would inhibit corporations practicing medicine let attention be called to the fact that the Medical Practice Act specifically sets forth exactly who may practice medicine in this state, item by item, and the word "corporation" is not included in it. This would indicate clearly that we do not need a law but rather an enforcement. But how can you enforce a law if attorneys, practicing barristers, supposedly executives and elucidators of the law, calmly enform the men that make the laws that they as attorneys and the bodies they represent do not intend to pay any attention to the laws!

This you will note was the comment made by a lawyer and a member of the board of the Public Health Institute when Senate Bill No. 362 was up.

We have already instituted quo warranto proceedings to test legality of corporations practicing medicine in Illinois. This was done some six months ago and the matter is in statu quo.

About a year ago the Supreme Court of the State of Illinois handed down a decision that had been before them for several years and that denied the banks the right to practice

law. That all lawyers do not think like the Public Health Institute representative is indicated by the steps that lawyers have taken to protect the individuality and rights of their own profession in the Illinois statute prohibiting corporations from Practicing Law passed by the General Assembly of Illinois in 1917.

This excerpt from the act is taken from Section 234 of Chapter 32 of Cahill's Illinois Revised Statutes:

Be it enacted by the People of the State of Illinois, represented in General Assembly: It shall be unlawful for a corporation to practice law or appear as an attorney at law for any reason in any court in this State or before any judicial body, or to make it a business to practice as an attorney at law for any person in any of said courts or to hold itself out to the public as being entitled to practice law or to render or furnish legal services or advice or to furnish attorneys or counsel or to render legal services of any kind in actions or proceedings of any nature or in any other way or manner to assume to be entitled to practice law, or to assume, use and advertise the title of lawyers or attorney, attorney at law, or equivalent terms in any language in such manner as to convey the impression that it is entitled to practice law, or to furnish legal advice, furnish attorneys or counsel, or to advertise that either alone or together with, or by or through, any person, whether a duly and regularly admitted attorney at law or not, it has, owns, conducts or maintains a law office, or an office for the practice of law or for furnishing legal advice, services or counsel.

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## PAPERS FOR 1933 ANNUAL MEETING

The 1933 Annual Meeting of the Illinois State Medical Society will be held in Peoria, on May 16, 17, 18, 1933. It is the desire of those in charge of arranging the program, that the 1933 Meeting be an All Illinois Meeting, with only members of this Society to appear on the Section programs.

All members desiring to present a paper before any of the Scientific Sections should get in touch with the Chairman or Secretary of the Section at the earliest possible moment. All prospective speakers are urged to send title of paper and an abstract, or description of same, so that it can be given the proper consideration by the Section officers. Case reports of interesting cases, well worked up, will also be given consideration, and in submitting same for the consideration of the Officers of Sections, a description of the case should be given. The 1933 Annual Meeting Program will be considerably different from those of past meetings, and will be one that will appeal to the average physician attending the meeting. It is desired that highly technical papers should be limited, and more practical subjects discussed. In each of the five Scientific Sections, one of the officers resides in Cook County, and the other, Down-State. All members in Cook County who would like to present a paper, or case report, should refer it to the Cook County Officer, and the Down-State men should refer theirs to the Down-State Officer. This arrangement will prevent unnecessary confusion and delay in arranging the programs.

For your information and convenience, we are giving the name and address of each Chairman and Secretary.

SECTION ON MEDICINE

Walter H. Nadler, Chairman, 8 South Michigan Boulevard, Chicago.

Richard F. Herndon, Secretary, Springfield.

SECTION ON SURGERY

Sumner M. Miller, Chairman, Peoria.

George W. Post, Secretary, 4010 West Madison Street, Chicago.

SECTION ON EYE, EAR, NOSE AND THROAT

Frank J. Novak, Jr., Chairman, 30 North Michigan Blvd., Chicago.

George S. Duntley, Secretary, Macomb.

SECTION ON PUBLIC HEALTH AND HYGIENE

John W. H. Pollard, Chairman, 1806 Maple Avenue, Evanston.

J. Howard Beard, Secretary, Urbana.

SECTION ON RADIOLOGY

P. B. Goodwin, Chairman, Peoria.

Robert A. Arens, Secretary, 2839 Ellis Avenue, Chicago.

It should be remembered that the number of papers which can be accepted for each program is limited, and in the selection of same by those arranging the program, every effort will be made to select those papers which in the judgment of the officers, are best adapted for a well balanced program. It is hoped that

every member who desires to have a place on the 1933 Meeting Program, will get in touch with the proper Section Officer at an early date, using the above for their guidance.

## IN RECENT YEARS THE ECONOMIC STATUS OF MEDICINE HAS BEEN PRACTICALLY TURNED INSIDE OUT

Legislation that advocates a bureaucracy to control and dominate the members of the medical profession to the extent that such bureaucracy determines the personnel of a physician's clientele and the fee he may charge regardless of the qualifications obtained and the specially skillful service rendered spells the beginning of the end of scientific medical service for the people.

It is just as unamerican for a bureaucracy to determine the clientele as it would be to determine the clientele of a butcher, a baker, or a candlestick maker. There is no difference in the application of the principle.

The physical welfare of our people was never so well taken care of as now. Preventive medicine has made tremendous progress and is the outgrowth of work accomplished by the organized medical profession.

Unfortunately the medical profession is confronted with numerous enemies without and a liberal sprinkling of traitors among its own ranks. A great number of men and women who have been bitten by that fatal parasite, the upliftus putrifaciens in the guise of uplifters, are seeking to eliminate the doctor by crushing his individuality, hampering initiative and hoping thereby to accomplish destruction of scientific medical progress, by attempting to divert the practice of medicine into untrained and incompetent hands, which will bring about, as it has done in other countries, the worst imaginable form of medical service.

The wolf at the doctor's door is about to catch by the throat the entire medical profession. Hidden under the cloak of State medicine, compulsory health insurance, national socialization of medicine and sundry other acknowledged offspring of radicalism and cheap politics, only a small percentage of physicians have guessed the evil for what it is.

Those doctors who are awake to the dangers threatening the profession, realize that unless radical action is accomplished speedily, the doctor will find himself deprived of the privilege of continuing his present occupation.

In recent years the economic status of medicine has been practically turned inside out. Figuratively speaking the physician has become a civic nonentity. Politicians have arrived at the state where with their business eye they regard a physician as "being in the world but not of it." Neither politics nor "big business" has hesitated to take advantage of this condition. Considered an "easy mark" to begin with, these interests proceed to make us "the goat" and endeavor to classify us as the cheapest of cheap labor. For years the medical profession has furnished the most servile of hired men for corporations and the great insurance companies. Now the profession is in a fair way to serve them even more servilely as vassals of the state.

Three curses are operating to the detriment of the government stability at the present time, they are: autocracy, bureaucracy, and bolshevism. Not centralization of more power at Washington is wanted but decentralization of that now existing there would go a long way to help remedy existing social ills. The present trend towards centralization of power in this country is raising an army of politicians and bureaucrats all of whom must be supported by general taxation of the people.

As a result of increase of bureaucratic dictation Americans are today the most ruled and standardized people in the world, and we are building up armies of citizens to enforce all the laws; by and by we shall all be state and government employees, earning our pay by watching or spying on one another.

The tendency of the age is toward paternalism. Paternalism is doing for the man what he should do for himself. It is the continuation of childhood care for the adult. "Paternalism is the principle or practice of a government or governing bodies that undertakes to supply needs or regulate conduct of the governed in matters affecting them as individuals as well as in their relations with the state or governing bodies and to each other on the assumption that it can best determine and secure their highest welfare."

The bug is in the medical profession. The propaganda is seen creeping out in the advo-

eacy of the wholesale treatment of the sick. The germ is in the corporation practice and so long as it was and is restricted it serves a purpose and has a place.

Job work in medicine does not get the best results. This is illustrated in government work. The work is done neither as well or as economically as in private practice of business. The weak link in the chain in job practice is the lack of personal responsibility.

## ILLINOIS STATE MEDICAL SOCIETY PHYSICALLY HANDICAPPED CHILDREN'S CLINICS

Conducted under direct management of local county medical societies.

1. Primal Unit, the County Medical Society, or if desired, a group of two or more adjoining or nearby County Societies.

2. Co-Operative Organizations—State Department of Public Welfare, State Department of Public Health, State Department of Public Instruction, and any other State Departments of Agencies which may desire to co-operate, Parent-Teachers Association, Dinner Clubs, Federation of Woman's Clubs, Local Nursing Units, and any other agencies desiring to aid in a co-operative way.

### THE PLAN

1. A staff of qualified clinicians is available to conduct the Physically Handicapped Children's Clinics. When desired by the local County Medical Society, a list of these clinicians will be sent to them by the Scientific Service Committee of the Illinois State Medical Society so that they may make their own selection.

2. The County Medical Society in arranging the clinics shall have the assistance of the Scientific Service Committee of the Illinois State Medical Society, or any special committee that may be selected for the purpose.

3. The clinics should be conducted regularly, according to the desires of the local Society or Societies, and if possible should be conducted at a hospital in the community where the clinic is to be held.

4. The actual arrangements for each clinic should be made by the local County Medical Society, or group of Societies.

5. A list of physically handicapped children in each county has been made available through a resolution passed by the Illinois Legislature ordering a survey in each county to get a complete list of all such cases. The survey has been completed, and the list of each county can be procured by the local County Medical Society desiring same, by applying to the Scientific Service Committee, a sub-committee of the Educational Committee, Illinois State Medical Society, 185 North Wabash Ave., Chicago.

### THE CLINIC

1. Each patient should be regularly admitted to the clinic and given a number, which number is retained for that patient for subsequent clinics.

2. All pertinent data concerning the case should be submitted by the family physician, and should include a history of the disability itself, family history, economic conditions under which the patient lives, etc.

It is most desirable to insist on all actual indigents bringing a statement of either economic condition from a supervisor of charities, township supervisor, or some other designated officer, in addition to statements from the family physician.

3. Patients able to pay a moderate, or even small fee for services rendered at the Clinic should do so, getting away from unnecessary pauperization.

4. It is always desirable to have visiting, community welfare, or Public Health nurses present at the clinic if same are available in the community.

5. The family physician of each patient should be urged to attend the Clinic, so that he will be better able to carry out the desired after-treatment.

6. Treatments prescribed or plaster of paris casts may be applied at the time of the clinic by the family physician, or in his presence, so that the suggestions of the clinician may be carried out properly.

7. A complete record of each case with the suggestions for treatment made by the Clinician should be made during the Clinic, and later written up in detail, a copy being retained by the Society or at the Hospital as desired, and one copy for the family physician.

A third copy can be made and given to a nurse, for follow-up visits if desired.

8. All patients referred to the Clinic should be assigned to a definite physician, if they have no regular family physician or any preference, in order that they may receive the proper after care.

9. It is always advisable for nurses, or someone designated for the purpose, to follow up each case, calling at the home of the patients soon after the Clinic to see that they desire to carry out the orders of the Clinician. Similarly, all patients should be notified before the Clinic so that they may appear at the proper time.

FINANCING THE CLINIC

1. The Illinois State Medical Society assumes no financial or other responsibility for the management or condition of Clinics.

2. It is recommended that the necessary financing of Clinics be managed by the cooperative organizations, which can be done in many ways, such as holding card parties, charity balls, rummage sales, home talent plays, etc., and possibly through such assistance as may be procured from civic or township organizations.

3. Arrangements should be made to pay promptly, the traveling expenses of any visiting Clinician. The Clinician should be given some modest remuneration for his services; such expenses and such fees can come from the funds collected for the operation of the Clinic.

THE RECORDS

The records of each case coming before the Clinic should be kept in cumulative form, in individual folders arranged for the purpose. They should include:

a. Patient's name, age, address, number, and name of the parents.

b. History—past, present, family, etc., in detail.

c. Examination records with all findings, all subsequent records of progress, suggestions made for the care of the patient, and all other pertinent data should be added from time to time.

d. Special examinations, including x-ray films, should be made a part of this cumulative record.

## AUXILIARY NEWS

During the past several years Mrs. T. O. Freeman, Mattoon, Illinois, immediate past president of the State Auxiliary, has endeared herself to the many members throughout the State, not alone for her many and excellent accomplishments as head of that fine group, but her charming and warm personality has won many dear friends and admirers.

All of these dear friends and close associates in the Auxiliary feel more than unusually sympathetic on learning of the passing of Dr. T. O. Freeman, and they extend to Mrs. Freeman a tribute of sincere sympathy and friendship.

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There will be held in Chicago on November 18th a Board Meeting of the Woman's Auxiliary to the Illinois State Medical Society. Mrs. E. W. Mueller, President will preside.

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The National Auxiliary will also hold their Board Meeting in Chicago, November 17th, and many of the Board members listed below will attend this meeting in Chicago.

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The roster of officers and chairmen of standing committees follows:

President, Mrs. Walter Jackson Freeman, Philadelphia, Pa.

President-Elect, Mrs. James Blake, Hopkins, Minn.

Recording Secretary, Mrs. Sherman S. Hesselgrave, St. Paul, Minn.

Corresponding Secretary, Mrs. Henry F. Page, Philadelphia, Pa.

Treasurer, Mrs. Robert W. Tomlinson, Wilmington, Delaware.

Vice-Presidents:

1st, Mrs. James F. Percy, Los Angeles, California.

2nd, Mrs. William R. Brooksher, Jr., Fort Smith, Arkansas.

3rd, Mrs. Arthur C. Christie, Washington, D. C.

4th, Mrs. Rollo K. Packard, Chicago, Illinois.

Directors:

One year—Mrs. Arthur B. McClothlan, St. Joseph, Missouri; Mrs. Arthur T. McCormack, Louisville, Kentucky; Mrs. Evarts V. De Pew, San Antonio, Texas; Mrs. Willard Bartlett, St. Louis, Missouri.

Two years—Mrs. Joseph Hume, New Orleans, Louisiana; Mrs. Joseph A. Pettit, Portland, Oregon; Mrs. J. Ralston Wells, Daytona Beach, Florida.

STATE CONVENTION, Peoria, May 16-18, 1933.

NATIONAL CONVENTION, Milwaukee, June 12-16, 1933.

Mrs. F. P. Hammond, Chairman
Press and Publicity.

## MEDICAL ADVERTISING SOLICITOR WANTED

The Illinois Medical Journal desires one or more advertising solicitors. Persons with advertising experience preferred. No guaranteed salary. Compensation on commission basis only.

Illinois Medical Journal,
6221 Kenmore Ave., Chicago.

## THE PASSING OF MRS. WALTER JACKSON FREEMAN

Members of the Woman's Auxiliary will be sorry to learn that Mrs. Walter Jackson Freeman, President of the Woman's Auxiliary of the American Medical Association, passed away in Philadelphia, October 27th.

Mrs. Freeman was the daughter of Doctor William W. Keen of Philadelphia, author of "Keen's Surgery," and Emma Corinna Borden Keen. She graduated from Vassar College in 1889 and was married on November 3, 1892 to Walter Jackson Freeman of Philadelphia, later Professor of Laryngology in the Polyclinic, now the Graduate Medical School. She was prominent in all civic activities, serving as Chairman of the South Philadelphia Woman's Liberty Loan Committee in the Third, Fourth and Victory Loans. She was executive secretary of the Jefferson Alumni Society for the year of 1922 and inaugurated the Jefferson Alumni Fund. The years from March, 1923 to May, 1925 were spent in Europe for the education of her youngest children. In January, 1926 she joined the newly organized Philadelphia Woman's Auxiliary and served as County Secretary, Vice President, and President, State President, Chairman of the Philadelphia Convention Committee, and then became National President Elect, entering upon her duties as President last June.

Her passing is a distinct loss to the Woman's Auxiliaries of the country.

The Woman's Auxiliary to the Illinois State Medical Society has joined with other state auxiliaries in a combined token of sympathy and condolence. The following telegram was also sent to Mrs. Freeman's family:

"The Woman's Auxiliary to the Illinois State Medical Society sends sincere sympathy. Our members have appreciated the thought and energy Mrs. Freeman has devoted to the work of the Auxiliary. We will greatly miss the inspiration but will remember with gratitude the splendid work done by her for our Society."

Mrs. E. W. Mueller, President
Mrs. Phillip H. Kreuscher, Secretary

## SOCIAL INSURANCE IMPOSSIBLE TO ABOLISH WHEN ONCE ESTABLISHED*

The worst feature of Social Insurance is the fact that when this parasite once gets its suckers well fastened into the vitals of a nation nothing short of either national bankruptcy, a dictatorship, or a revolution will be able to loosen its hold.

Germany which has had Social Insurance on its statute books the longest has for a considerable time been on the verge of bankruptcy. While other facts are operative, we believe that the billion dollars which Social Insurance costs the nation every year is one of the chief reasons why Germany is unable to make a satisfactory "come-back" to normalcy.

England is not much better off. The chief reason for England's present difficulties is the terrific burden of taxation which she has to carry. One writer says: "A complete understanding of the problems confronting England at the present time involves going back to 1909 when we had just adopted old age pensions and destroyed the foundations of thrift." In 1911 England introduced National Insurance when three per cent of its workers were unemployed. After twenty years of operation of the act, seventeen per cent of her workers are out of work. As a partial explanation for this condition let us cite just one example from among scores and hundreds that could be given. A manufacturer found that his orders were only sufficient to give work to all his employees four days a week so he called his workers together and told them the facts. The workers, however, insisted that they would work only three days a week in order that they could draw the dole for the other three days. An English writer commenting on this says: "It is a great mistake to worry about the much

*Tenth installment of Dr. Edward H. Ochsner's articles on Medical Economics.

discussed abuses of the system. It is the system which is fundamentally wrong and abuse is inseparable from it."

To get an idea of the tax burden which England is carrying, we need but cite facts. In that country all incomes of seven hundred and fifty dollars per annum are taxed twenty-five per cent. Higher incomes carry an additional surtax. Increased taxes have increased the production-cost of practically all articles of manufacture and, as a consequence, have actually increased unemployment because English Industry carrying this extra burden has not been able to compete with other countries in the world markets. In spite of these burdensome taxes and in spite of the fact that living expenses had gone down eleven and one-half per cent, the recent labor government refused to cut the sick benefits ten per cent and put the nation to the expense and turmoil of a national election practically on this issue alone.

The countries just cited are not the only ones encountering similar difficulties. A recent newspaper article contained the statement that there are more than one hundred and fifty federal boards and commissions in Washington each with three or more members drawing salaries and each with a bevy of clerks most of them just drawing salaries. Many of these were created during the World War. When a few farsighted individuals remonstrated against the appointment of so many boards and commissions they were assured that they would all be abolished at the end of hostilities. It is now more than fourteen years since the signing of the Armistice but not one board has as yet been abolished.

Another illustration is the franking privilege to country newspapers. This privilege was extended to them when it was deemed desirable to disseminate news and information to rural inhabitants particularly to detached settlements. It was a wise and legitimate enactment at the time but now it is just a plain nuisance and yet no congressman would dare to suggest its abolition. It is costing the taxpayer and consumer a great deal of money and serves no useful purpose. A town of ten thousand and even fewer inhabitants usually has two and sometimes three local papers all enjoying this privilege. The local merchants are compelled to advertise in all of them, the expense of which must of necessity be passed on to the consumers. Incidentally this favors the mail order houses to the detriment of the local merchant.

There are many reasons why it is almost impossible to repeal the laws governing such practices. One reason is that executives and legislators do not want them repealed because it reduces the power which they derive through political patronage. The more patronage the individual in office has at his disposal, the more difficult it is to dislodge him. Even today it is very difficult to defeat a public office holder with large political patronage, no matter how inefficient he may be, except by another who either already has large political patronage or who promises jobs to his supporters irrespective of their qualifications. Thus in many elections the voter is simply left to choose between two undesirable candidates. Already the number of payrollers has become so large and so politically active and influential that they yield great power in both political parties. If we then add compulsory health insurance we will add further thousands to the lists of our civil employees. Those who are not in government employ will be powerless to control government and their only function will be to pay the taxes which others impose upon them. Instead of increasing the number of government officials and employees, the ideal to be constantly kept in mind and striven for in this country is to permit the private citizen to perform all those functions that he can best perform and that make for independence, self-reliance, and strength of character and to have the government do only those things which the individual cannot do satisfactorily. We maintain that centralization in government and paternalism here already gone much too far and that Social Insurance would simply be another step in the wrong direction.

Another reason why it will be difficult to repeal such laws is the fact that men in the different services of the government do not dare to expose its faults for fear of being accused of disloyalty. Reports must be couched in the most mild and ineffective language possible and then they must not be released to the public but allowed to die as still-births in the departments. We all know what happened

to General Mitchell who dared to disregard these rules. Major-General Robert Alexander also tells in the introduction to his Memoirs of the World War just how this worked in at least one other instance.

In most countries which have Social Insurance such laws were first suggested and urged by welfarers, uplifters, and visionaries who unwittingly played into the hands of practical politicians. Even now few seem to realize that bureaucracy in a republic may become just as unreasonable, oppressive, and ruthless as a despotism.

It will be interesting to see whether we shall be able to profit by the experience of others or whether as a nation we belong to that class of human beings who can learn only by dire personal experience or from national disaster. (The next article will offer a number of counter-suggestions in place of Social Insurance.)

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## EDUCATIONAL COMMITTEE REPORTS PROGRESS FOR OCTOBER, 1932

### PRESS SERVICE

1,017—Articles sent out to Illinois newspapers.
496—Regular press service.
27—Newspapers, monthly service.
31—Newspapers, meeting Franklin County Medical Society.
99—Newspapers, meeting LaSalle County Medical Society.
71—Newspapers, re meeting Livingston County Medical Society.
62—Newspapers, meeting McDonough County Medical Society.
58—Notices Tri-County Medical Society.
82—Notices Southern Illinois Medical Association.
22—Community newspapers, re meetings Branch Societies of Chicago Medical Society.
3—Chicago Association of Commerce, meetings of Chicago Medical Society.
66—Home Bureau Advisers, material on colds.

Press articles written and approved on "A Common Tooth Trouble" and "Parrot Fever Warning."

### RADIO

47—Radio talks given over WJJD, WGN and WAAF. All papers approved by Educational Committee before they were given.

### SPEAKERS' BUREAU

46—Speaking appointments made for physicians before lay groups. Meetings represented, State Nurses Association, Women's Clubs, Parent Teacher Associations, Mothers' Study Clubs, High Schools, Teachers Institutes, Business and Professional Women's Clubs, Kiwanis Clubs, Lions Clubs.

### SCIENTIFIC SERVICE

19—Physicians scheduled to present scientific papers before the following county medical societies:
Will-Grundy.
DeWitt.
Rock Island.
McDonough.
LaSalle.
Livingston.
Kankakee.
Sherman Hospital, Elgin.
Paris Hospital, Paris.
McHenry County.

### SPECIAL SERVICE TO COUNTY MEDICAL SOCIETIES

Lay Educational Programs sponsored by the Chicago Medical Society have been announced over the radio during the health talks given by representatives of the Illinois State Medical Society.

Announcements of these programs enclosed with all mail going from the office of the Educational Committee.

384—Postal cards sent to physicians announcing meeting of LaSalle County Medical Society.

160—Notices to physicians announcing meeting of Livingston County Medical Society.

### MISCELLANEOUS

15—Package Libraries sent to physicians.
5—Moving Picture films secured for lay meetings.
1—Canti cancer film secured for county medical society.
415—Notices mimeographed for the Woman's Auxiliary of the Chicago Medical Society.

The Educational Committee for the third consecutive year has been asked to arrange two programs a month for the Pre-Medical Club of Central Y. M. C. A. College. A series of health lectures is being planned for Marcy Center, Chicago and another series of health programs for the Englewood Y. M. C. A.

JEAN McARTHUR, *Secretary.*

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## A SERIES OF FIVE LECTURES ON CANCER

A series of five lectures on cancer is announced by the Institute of Medicine of Chicago and the Cancer Research Committee of the Chicago Woman's Club, to be delivered by Max Cutler, M.D., Director Tumor Clinic, Michael Reese Hospital, in the Chicago Woman's Club Hall, 72 East Eleventh Street, Chicago. These lectures will cover the field of causation, prevention, early diagnosis, and treatment of cancer. The material presented will include in chronological order the historical landmarks in the progress of the knowledge of cancer, a description of recently discovered contributing causes, and a review of the modern treatment as practiced in the great cancer clinics of America and Europe. Special attention will be directed to the newer developments in the technic of roentgen ray and radium, and the results of the modern treatment will be shown and illustrated. The lectures will begin promptly at 8:15 o'clock and will last one hour.

Friday evening, November 4: CAUSES OF CANCER AND ITS PREVENTION.

Friday evening, November 11: Early Diagnosis of Cancer.

Friday evening, November 25: Surgical Treatment of Cancer.

Monday evening, November 28: Radiation Treatment of Cancer.

Friday evening, December 2: Results of the Modern Treatment of Cancer.

### PARROT FEVER WARNING ISSUED BY PUBLIC HEALTH SERVICE

The United States Public Health Service advises all persons to avoid contact with recently shipped or acquired birds of the parrot family. Several cases of psittacosis, or parrot fever, are being reported in various parts of the United States. Reports of 5 cases and one fatality have recently been received from Minneapolis, Minn. Another case has been reported from Boise, Idaho. There have been 12 cases of parrot fever, with 6 deaths, reported in California between December 1, 1931, and February 10, 1932.

Upon the recommendation of the Public Health Service, the Secretary of the Treasury has recently issued an order amending the interstate quarantine regulations so as to limit the interstate transportation of birds of the parrot family by common carriers to those certified by the proper health authority of the State as coming from aviaries free from infection.

A medical officer of the Public Health Service at the invitation of the California State Department of Public Health, within the recent past made a careful study of the situation in California with reference to parrot fever infection and the breeding of birds of the parrot family in that State. Conclusive evidence was thus obtained which indicates that psittacosis, or parrot fever infection is present in some of the breeding aviaries of Southern California. Parrots and parrakeets from this source have probably been one of the important means of spreading the disease to other States. The cases occurring in Minneapolis and Boise were traced to California birds as well as previous cases this year reported from New York City and Oregon.

An outbreak of psittacosis or parrot fever occurred in the United States during the Winter of 1929-30. One hundred and sixty-three cases were reported at that time, with 33 deaths. Practically all of these cases were traced to association with recently acquired parrots and parrakeets.

### ANNUAL MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS

Announcement has been made that the American College of Physicians will hold its Seventeenth Annual Clinical Session at Montreal, with headquarters at the Windsor Hotel, February 6-10, 1933.

Dr. Francis M. Pottenger of Monrovia, Calif., as President of the College, has charge of the program of General Sessions. Dr. Jonathan C. Meakins, Professor of Medicine and Director of the Department, McGill University Faculty of Medicine, is General Chairman of local arrangements and in charge of the program of Clinics. Mr. E. R. Loveland, Executive Secretary, 133-135 S. 36th Street, Philadelphia, Pa., is in charge of general business arrangements, and may be addressed concerning any feature of the forthcoming Session, including copies of the program.

## Correspondence

### THE INDISCRIMINATE USE OF THE WORD "DRUG" WHEN NARCOTIC SHOULD BE USED

Eli Lilly Company, Indianapolis, Indiana

October 24, 1932

To The Editor: Those of us engaged in pharmacy feel that the indiscriminate use of the word "drug" where "narcotic" or "dope" should be used is a reflection on an honorable business and profession and tends to degrade it in the minds of many lay readers. As defined in the National Food and Drugs Act, a drug is an article used for the purpose of curing, mitigating, or preventing disease in man or other animal.

News writers and headline writers frequently refer to "drug" addicts, "drug" fiends, and "drug" raids when they mean narcotic (or "dope") addicts, narcotic fiends, and narcotic raids.

There is no objection on the part of the pharmaceutical profession and the drug trade to the publication of the misdeeds or misadventures of "dope peddlers" or "dope addicts," but to describe them as "drug peddlers" or "drug addicts" does an injury, so we are asking all editors to help discontinue the practice of using the word "drug" where the word "dope" or "narcotic" should be employed. There are assurances from the editors of newspapers that the subject will have their attention.

The practice is widespread in medical and pharmaceutical literature. Nearly every one having to do with such publications has been guilty of this misuse of the word "drug," even those of us who are seeking a discontinuance of the abuse.

If the editors of the medical journals would use the word "narcotic" or "dope" instead of "drug" in news items of raids or convictions, and in the columns advertising treatment for narcotic addicts, it would be a material aid in correcting an objectionable practice. Your cooperation to this end is earnestly requested.

John S. Wright, Director

## Original Articles

# HERNIA OF THE LUNG (PNEUMOCELE)*

*Roentgen Study with Report of Traumatic Case*

HARRY A. OLIN, M. D.*
*CHICAGO*

Synonyms: Hernia of the lung, pneumocele, pneumonocele and pulmonary hernia.

A protrusion of any part of one or both lungs through an abnormal opening into the normal boundaries of the thoracic wall is a true hernia. Usually the sac is covered by parietal pleura and may extend into any layer of the chest wall. When the hernia is fully developed, however, the sac is always covered by skin.[1]

Hernia of the lung is essentially a rare condition. A perusal of the literature and the text-books cite less than two hundred cases. It is nevertheless surprising that, with the great number of penetrating bullet wounds and crushing injuries of the chest occurring in warfare and in civilian life, lung hernia is not more frequent. In the South African War (1899-1900) Makins, in an extensive war experience, reported but one case, while Adams in the Russian Japanese War was able to find only five out of twenty thousand chest wounds.[2] We are indebted to Rolandus[3] who in 1499 published the first operative case.

The literature contains some cases of eviscer-ation and prolapse of the lung, erroneously considered by the early writers as lung hernia. Up to 1800 only fifteen true cases of lung hernia were reported. To Morel-Lavellée[4] we owe the following classification:

1. According to location.
   - A Diaphragmatic
   - B Thoracic
   - C Cervical
2. According to etiology
   - A Congenital
   - B Acquired
     1. Traumatic
     2. Consecutive
     3. Spontaneous
     4. Pathological

Anatomical Factors: Most writers on this subject have enumerated the anatomical variations in structure of the chest wall, since the locations of the herniae have commonly developed at the weak sites. Added to this, one may include any weak spot in the thoracic wall, whether due to congenital defect or injury—called by most writers a "locus minoris resistentiae." Long continued strain associated with increase of intrathoracic pressure is another factor concerned with the production of hernia. The weakened areas in the chest wall are, in front, the costal cartilages near the sternum, and posteriorly, the interspaces near the vertebrae. The anterior costal cartilages possess no external, intercostal muscles while posteriorly the internal group of muscles—the internal intercostals—extend only to the angle of the ribs. Herniation most commonly occurs anteriorly because of the "locus minoris resistentiae," safeguarded by the pectoral muscles, affords insufficient protection, whereas the muscles of the back, represented by the latissimus dorsi, trapezius and rhomboidei, are much stronger and present a more powerful barrier. Superiorly, the excursion of the apex of the lung is limited by the dome of the pleura; while hernia here rarely occurs, when it does, it is due to the space between the scalenus anticus and the sterno-mastoid muscles which affords an area of lessened resistance. Congenital defects are usually located near the sternum but may occur in the apex of the chest, in the diaphragm, the muscles or the ribs.

Auler and Urbach, from a study of 85 cases, reported the relative frequency as follows: congenital 24, traumatic 47, and spontaneous 31 per cent.[5, 6] Montgomery and Lutz, in a study of 165 cases, reported in the literature, show figures which correspond very closely to those of Auler and Urbach with the following percentages: congenital 18, traumatic 50 and spontaneous 32. As regards location, the same authors, in a series of 78 cases, enumerate as follows: cervical 16 of which 10 were on the right side and 6 on the left, anterior chest wall 57 of which 34 occurred on the right side and 23 on the left, 5 were found on the posterior chest wall with 3 on the right side and 2 on the left.[7]

Congenital Pneumocele: Any defective development of the thoracic wall may give rise to a hernia. Hochsinger[8] regards the congenital type as only those occurring in the first weeks

*Read before Section on Radiology, Illinois State Medical Society, Springfield, May 18, 1932.

*From X-Ray Department, Woodlawn Hospital, Chicago.

of life. Because of the weakness of the anatomical structures in the apex of the lung and the extension of the pleural dome into the neck, this site offers the predilected location for herniation. Arrested growth of structures, composing the chest wall and sternal clefts in this region, predispose towards the formation of hernia. Intrauterine abnormalities due to pressure of the elbow against the fetal chest, amniotic bands, pressure from tumors as fibroids may give rise to defects of the thoracic cage. The pneumocele may appear many months after birth or at any time and difficulty may be encountered as to its congenital origin.

Traumatic Pneumocele: This type comprises the largest number and herniation may develop any time following an injury to the chest wall. It may occur in an old scar, whether due to trauma or that following operations as the Estlander operation. Penetrating and bullet wounds of the chest favor the greater incidence of herniation; next in frequency are crushing injuries of the chest wall from any cause. In the War of the Rebellion only 3 cases were reported. In twenty thousand chest wounds in the Russian Japanese War only 5 cases were cited. In the late World War no cases could be found. Because of the inherent elasticity of the lung, which causes it to contract and retract from the chest wall, when the intrapleural and intrapulmonary pressures become equal, herniation in these cases becomes a rarity. When pneumocele does occur, it is usually complicated by hemothorax and pneumothorax. Traumatic hernia may occur with no visible signs of external injury and crushing forces, falls from a height and non-union of fractured ribs may result in a "locus minoris resistentiae" which subsequently may develop herniation. Morel-Lavalée classified traumatic hernia as those occurring soon after injury and the consecutive type as those resulting later after an injury.[4] Most writers ignore this latter type, inasmuch as the consecutive group differ only in the time of appearance.

Spontaneous Pneumocele: Two factors must be present to produce hernia in this type; first the existence of a "locus minoris resistentiae" in the boundaries of the chest cavity, and secondly an abnormal increase of the air pressure in the alveoli of the lungs as either factor, per se, seems incapable of producing herniation. Since no congenital or traumatic defect in the chest wall is present in this type, long-continued or excessive increased intra-thoracic pressure and strain force a portion of the lung through an area in the chest wall, weakened by its anatomical peculiarity. Pressure changes in the lungs are due to voluntary or involuntary contractures of the muscles of the thoracic cage, associated with varying degrees of closure of the glottis.

Abnormal increase in pressure changes may occur in paroxysmal cough as in chronic bronchitis, tuberculosis, whooping cough or lung suppuration, foreign bodies in the lung, etc., blowing wind instruments, violent muscular exertion as heavy weight lifting and during the course of labor. For example, Masoti[9] and Koennecke[11] report lung hernia following violent exertion in weight lifting; pneumocele following paroxysmal cough in tuberculosis has been reported by Smith and Johnstone.[10] Urbach[6] in a study of 26 cases of spontaneous pneumocele found the following distribution: supraclavicular 7, first interspace 6, second interspace 2, fourth interspace 1, fifth interspace 2, sixth interspace 3, seventh interspace 2, eighth interspace 1 and sternum 1.

Pathological Pneumocele: Some authors have reported lung hernia following disease of the thoracic wall as abscess of the chest wall and breast; also following lung abscess or lung suppuration or empyema perforating into the chest wall; also malignant tumors breaking through the chest wall; occasionally ulcerative tuberculosis will break through into the chest wall. Such conditions may destroy the chest wall, leaving only the skin and subcutaneous tissues present. Over such an area, bulging on expiration and cough may be present which may simulate hernia but the underlying condition is readily detected.

According to its location, pneumocele may be cervical, thoracic or diaphragmatic; the cervical type is most rare and the thoracic is by far the most common. Only one case of diaphragmatic lung hernia has been reported in the literature. It was described by Beale[12] following an injury to the diaphragm and perforation of the small intestine; the lung herniated through the diaphragm and a subphrenic abscess developed followed by general peritonitis; post mortem findings revealed the presence

of lung tissue in the subphrenic abscess, the portion of herniated lung was amputated by the diaphragm but no opening in the diaphragm could be found.

Signs and Symptoms: Generally speaking, there may be no symptoms, especially in the non-traumatic form. In some, pain localized over the herniation may be the first symptom; at times tenderness and pain persist especially those associated with spasmodic, unproductive cough which disappears when the hernia is cured. In some, no symptoms are present until the patient notices a bulging of the chest wall. In the acute, traumatic variety, the severity of the injury to the viscera may mask the symptoms. Later pain may be the most constant symptom during the development of the pneumocele and is aggravated by cough, deep breathing and muscular exertion.

If the hernia is associated with hemo- and pneumothorax, followed by infection, cough may be very painful and paroxysmal in character with expectoration of considerable amounts of pus, as in the author's case. Once the hernia is fully developed, requiring about a week in the reported case, pain ceases and the patient is unconscious of its presence during quiet breathing. However, if the hernia is reduced and strapped, even during a coughing spell the pain is considerably relieved. Fractured ribs and injury to the pleura and lungs may increase the pain. As a rule, hernia of the lung rarely becomes strangulated unless infection causes the formation of adhesions, making it irreducible.

On inspection, a bulging mass is visible which appears and disappears during breathing; *forced expiration*, muscular exertion and cough *increases* its size, whereas *forced inspiration diminishes* its size or a depression may be noted in the interspace. As a rule, it is readily reducible unless incarcerated or adherent from local inflammation. The hernia may vary in size from that of a small bird's egg to that of a baseball and is usually covered by skin. It may be round or ovoid in shape. On palpation, a soft, spongy, crepitant tumor is felt. The orifice of the hernia is bony or fibro-muscular; sometimes a bony irregularity may be noted. The finger may be inserted to the depth of the orifice, at the same time reducing the tumor. The percussion note is usually tympanitic and tactile fremitus is increased; auscultation depends upon pathology present; vesicular whistling and crepitant rales may be heard. If fluid is present in the sac, gurgling sounds predominate.

A palpable orifice, through which a smooth, soft, crepitant, reducible tumor appears under the skin, the size and shape of which varies with respiration, should make the diagnosis perfectly evident, although mistakes have been made.[1] In the author's case, subcutaneous emphysema was present in the soft tissues of the chest wall and its recognition will be dealt with later in the differential diagnosis.

Conditions Simulating Hernia: Among these may be mentioned subcutaneous emphysema, empyema necessitatis, lung abscess, lung suppuration and degenerative malignancy breaking through into the chest wall, tumors of the thoracic wall, abscess of the chest wall, T. B. caries of the ribs and gas bacillus infection. Bulgings, sometimes observed about the clavicle in tuberculosis with prolonged cough and emphysema, are not true herniae, neither are ulcerations of the chest wall from invasion of a T. B. process which exposes the lung and causes evisceration of the viscus. Subcutaneous emphysema may follow injury to the lung and pleura, rather widespread as occurred in the writer's case; some of these pockets of air in the subcutaneous tissues may coalesce and form bulgings in the chest wall; they yield crackling sounds when palpated and the air in them is readily displaced; in addition no changes occur with respiration, as in pneumocele. Gas bacillus infection may occur in crushing injuries of the chest and may cause a bulge in the soft tissues, but signs of infection characteristic of this condition may be recognized and the respiratory phenomena are absent.[14] To name any tumor of the chest wall would be sufficient to rule out this possibility. Chest wall abscess is likewise considered. A punctured wound, traumatic or otherwise, may cause subcutaneous emphysema; it sometimes follows paracentesis of the chest and influenzal pneumonia, spreading, in the latter condition, over the neck and abdomen. In empyema necessitatis a bulging, external tumor may simulate lung hernia; the tumor may increase in size or diminish during coughing or forced breathing. The presence, however, of crepitant lung tis-

sue, plus other signs of hernia and the respiratory phenomena will cause recognition of the true condition.

Roentgen Observations: The presence of a bulging mass, increasing in size and volume during expiration, reaching its maximum during forced expiration, cough and muscular exertion and diminishing in size during quiet breathing and forced inspiration, may be noted with precision by a thorough fluoroscopic study of the chest and is considered pathognomonic of pneumocele. The tumor may be grasped in the hand and the contents of the sac reduced with the examining fingers holding the mass in place, providing there are no adhesions or incarceration to cause an irreducible pneumocele. The orifice of the hernial cavity may be felt as well as its borders while the examining fingers penetrate the cavity depth. In the lateral position, on the affected side, the respiratory phenomena are best observed; sometimes the obliques will bring out more bulging of the herniation. The lateral, recumbent position with the affected side up will also confirm the other positions. Antero-posteriorly the sac may be noted by a zone of increased radiance once the location of the pneumocele is determined. Of course fluid in the sac is readily determined by a change of fluid level varying with the position of the patient. Other pathology will be noted as fluid in the pleural cavity, fluid and air or areas of mottling as in tuberculosis. The excursion of the diaphragm on the affected side may be diminished or absent if pleural fluid is present. Later, as in traumatic pneumocele, in healing the diaphragm on the affected side may be elevated. The position of the heart and mediastinum remains unaltered unless fluid or, later, pleural adhesions cause these changes. Usually the hernial sac is located between the ribs and near the sternum anteriorly although it may occur anywhere in the chest. Cough and muscular exertion should be performed by the patient during fluoroscopy to study its effect on the hernial protrusion. The lung may be partly compressed in the sac if there is sufficient fluid present to cause compression.

Roentgenograms should be taken in the following positions:

A. Antero-Posterior.

B. Lateral Recumbent—affected side up.

C. Lateral, of affected side.
   1. Quiet Breathing
   2. Forced Expiration
   3. Forced Inspiration

D. Postero-Anterior—if sac is in posterior chest.

E. Oblique—anterior or posterior, depending upon location.

The thought has occurred to the writer that the introduction of lipiodol into the lungs and into the herniation may add information not otherwise obtainable. Since there has been a recurrence of the pneumocele six months following injury (in the author's case) an attempt will be made to carry out this idea.

My thanks are due to Dr. A. J. Brislen for his kind suggestions and the privilege of reporting this case; to Dr. Carl Hedbloom, to whom I cited the history of the case and who examined the Roentgenograms and likewise to Dr. Jas. G. Montgomery of Kansas City for his expression of opinion by correspondence.

Conclusions: A classification of lung hernia is cited with the anatomic considerations. Briefly the physical signs and symptoms are enumerated. Finally the Roentgen signs as observed by fluoroscopic study and Roentgenograms are mentioned and evaluated. Because of its extreme interest and rarity, the following case record is cited.

Case 1. No. 13124; W. N.; male; age 42; occupation mechanic; admitted to Woodlawn Hospital, 9/30/31; service of Dr. A. J. Brislen; admitting diagnosis, Crushing Injury Right Chest.

On 9/27/31, while driving his automobile on a mountain road, to avert a collision with an automobile truck, struck a culvert, the car turning completely over and the steering wheel striking his right chest below the clavicle. Severely injured, he was taken to a neighboring hospital for first aid; he left the hospital and made a fourteen hour railroad journey to Chicago to the home of a relative and was admitted to the Woodlawn Hospital on the afternoon of his arrival, 9/30/31.

Physical Examination: Male 42; weight about 140 pounds; in extreme pain in a crouching position and grunted with each respiration; face a dusky hue; respirations 32; temperature 101.4; pulse 108; white blood count 15,750. Subcutaneous emphysema in a marked degree was present from the lower jaws to the iliac crests; in the proximity of the third anterior rib was a small superficial wound, 2.5 cm. in length, on the anterior chest wall and a contused area, 5.0 cm. in diameter. The right, second, intercostal space anteriorly was depressed but bulged somewhat on expiration. Respirations were somewhat superficial and labored and, when deeper, dyspnea and excruciating pain were

present. Cough with expectoration of a thin mucopurulent secretion mixed with blood was present. The patient appeared poorly aerated, although no distinct cyanosis was present.

Chest: Right thorax painful to palpation and percussion, particularly in front; dullness in the lower half of the right chest, back and front, with absence of fremitus; a very distinctly tympanitic area, most marked between the anterior and posterior axillary lines, superimposed on the dull area, was noted. On ausculation, breathing sounds were bronchial in character and intensified and most marked over the right, upper anterior thorax, where numerous moist rales were heard. Breath sounds were absent over the lower half of the right chest (posteriorly).

X-ray Examination, 9/30/31: Upper Thorax: There is definite pathology involving the entire right chest with the exception of the extreme apex which shows marked infiltration of the soft tissues with air. The soft tissues of the anterior chest wall and in the region of the axilla as far down as the tenth rib show cutaneous emphysema. Owing to the scoliosis in the lower dorsal vertebrae to the left, much of the shadow of the right heart is seen but the heart is, however, in its normal position. There appears to be angulation of the second to the fifth ribs, inclusive, in about the anterior axillary line in comparison with the corresponding areas of the left side; this is indicative of fracture. The lower three-fourths of the right chest is occupied by a dense, homogeneous shadow through which are seen irregular areas of air mingled with areas of emphysema in the soft tissues of the chest wall. This shadow obliterates the diaphragm and the costo-phrenic angle.

Lower Thorax: The emphysema has invaded the soft tissues of the left lumbar region. There is quite marked scoliosis in this region which causes deformity of the lower ribs but there is no evidence of any fracture.

Summary, Lower Thorax: Multiple fractures right anterior ribs; fluid right pleural cavity; injury right lung; cutaneous emphysema right chest wall; traumatic pneumonia right lung; old scoliosis. Lower Thorax: Cutaneous emphysema.

From these findings the following diagnosis was made:

1. Contusion and small lacerated wound right anterior chest wall with destruction of some of the intercostal tissues at the second and third ribs.
2. Multiple fractures right anterior ribs.
3. Injury to right lung, inducing bronchial fistula, open pneumothorax and hemothorax.
4. Subcutaneous emphysema extending from lower jaws to the iliac crests.
5. A bulging mass, right anterior chest, which condition proved to be one of the most novel and interesting of his injuries of which more will be said later.

Course and Progress: The dyspnea and the chest pain improved after a few days. The cough persisted, though better controlled after the first few days. The hemoptysis gradually subsided until about the fifteenth day it ceased to be a factor. The expectoration varied from purulent, blood tinged to clear mucus through the subsequent course. During the first week the bulging in the region of the second and third ribs increased in size, attaining approximately the size of a baseball, growing smaller with inspiration and exceedingly tense and larger with expiration and with cough. During quiet breathing, there was noticed a depression in the region of the hernial sac. The examining finger, when introduced, penetrated a depth of about 3.5 cm. The mass could be grasped and easily reduced and held in place; it felt soft, consistent, crepitant to the touch and the fluid could be displaced. The borders of the orifice could readily be felt and consisted of the edges of the costal cartilages; through the orifice the pulsion mass, covered by skin, could be made to appear and disappear with respiration. Full expiration and cough caused the mass to assume its largest size. It was noticed that this maximum size could also be attained when the patient used muscular exertion as reaching out of bed for a glass of water or pulling himself up in bed with his arms over his head. The herniation was tympanitic in note and harsh breathing could be heard with whistling, crackling rales. No pain was felt during manipulation of the hernial sac at this time.

A pad of the hernial type was strapped over, compressing the hiatus between the second and third ribs, with a visible improvement in comfort to the patient. Irregular temperature of a septic type persisted through the six weeks of hospitalization, declining during the last ten days to a practically normal temperature.

The white corpuscles ran as follows:

| | | | |
|---|---|---|---|
| October 1 | 15,750 | October 18 | 12,100 |
| October 5 | 25,800 | October 21 | 10,250 |
| October 8 | 28,550 | October 26 | 11,350 |
| October 12 | 18,150 | October 29 | 17,075 |
| October 15 | 19,100 | | |

In connection with the W. B. C., it may be well to note the fact that an aspiration of 950 cc. of pus with the replacement of an equal amount of air was done on October 22, at the time of the lowest white count. The laboratory report on this pus is as follows: "Direct smear shows numerous pus-cells, no organisms. 76 hour incubation shows no growth—sterile."

X-Ray Examination, 10/12/31: Roentgen examination of the chest reveals the lower one-half of the right chest occupied by a dense, homogeneous shadow obliterating the ribs, diaphragm and costo-phrenic angle and showing a definite horizontal level. With agitation, definite fluid waves can be seen. Just above this level is an oval shadow of rarefaction which corresponds to the bulging air pocket in the anterior chest wall. With the patient in the right, lateral, recumbent position a plate reveals considerable pneumothorax with three definite fluid levels—the one of the pneumothorax, the second the pocket of air and fluid on the anterior chest wall and the third a pocket of air and fluid beneath the second portion of the sternum. Lateral views at forced inspiration and expansion of the chest wall causes diminution in size of the air pocket on the anterior chest wall; with forced expiration of air the chest is contracted, the external pressure relaxed and the air pocket in the anterior chest wall *bulges*. The

area of interstitial emphysema seen in the soft tissues of both necks, the anterior chest wall and the abdomen has considerably diminished since the first examination. It is difficult to establish the communication between the pockets of air in the chest wall and the pneumothorax.

Summary—Diminution of interstitial emphysema; large hydro-pneumothorax; localized pocket of air and fluid on right anterior chest wall in the region of the second and third ribs; pocket of air with fluid behind the mid portion of the second piece of the sternum; bulging pocket right anterior chest wall—hernia of the lung.

X-Ray Examination, 11/2/31 (Thirty-fourth day in hospital): Reexamination of the chest reveals an increase in the homogeneous shadow of the right chest from the second anterior rib to the base, obscuring the diaphragm, lower ribs and costo-phrenic angle. The amount of the pneumothorax in the pleural cavity has diminished although there is an increase in the amount of fluid in the chest at this time. The pocket of air beneath the right clavicle on the anterior chest wall has considerably diminished and is now seen along the anterior wall of the chest. The pocket of air behind the sternum is likewise considerably smaller.

Summary—Increased, right pyo-pneumothorax; interstitial emphysema along the anterior chest wall; hernia right lung.

On this report the patient was sent to the operating room, November 4, for thoracotomy which was started. The patient expectorated a considerable quantity of purulent material on the table. Aspiration through the sixth, seventh and eighth intercostal spaces yielded no fluid. Because the percussion note was tympanitic and no fluid could be obtained at this time, the operation was discontinued and the patient was returned to the ward. It was felt that the patient, through the bronchial fistula, had coughed up most of the fluid in the pleural cavity since repeated attempts at aspiration obtained no fluid. (Dr. A. J. Brislen)

The temperature gradually subsided and the general condition and cough became much better. November 11—the forty-third hospital day—the patient left the hospital with a temperature of 99, pulse of 110 and respirations of 20; in good general condition.

X-Ray Examination, 11/24/31: Reexamination of the chest in comparison to that of 11/2/31 reveals a complete absorption of fluid in the right pleural cavity with almost complete expansion of the entire right lung with the exception of the right base, the diaphragm of which is still elevated but shows a fairly good excursion, although not as deep as on the left side. The several pockets of air and fluid, seen on the previous examinations, have disappeared. In the right chest there is still some irregular mottling at the base, residual of the infection, associated with thickened pleura. The markings as a whole are accentuated with a band of thickened pleura seen in the third right anterior interspace. The trachea and heart are in their normal positions but the mediastinal shadows show definite root thickening which is undoubtedly associated with the previous pyo-pneumothorax.

Summary—Obliteration of several pockets of air and fluid; complete absorption of interstitial emphysema; restoration of expansion of right lung; residual pathology right base with thickened pleura; hernial sac absent.

Physical Examination, 11/24/31: Examination revealed a good respiratory sound and resonance down to the region of the sixth rib in the axillary line and the eighth rib in the posterior scapular line; coughs rarely; has been going out of doors for the past week; appetite good and general strength returning. Seen last, 11/30/31; no complaints; sent back to resume work in a garage. (Dr. A. J. Brislen.)

Binney is of the opinion that lung injury by sudden pressure or rupture by the sharp end of a fractured rib will usually cause hemoptysis and some degree of pneumothorax or both. If pneumothorax is present, sooner or later signs of cutaneous emphysema of the chest wall may appear.[15]

Discussion: The noteworthy feature in this case was the presence of a protruding mass or bulging of the anterior chest wall, the size of a baseball, in the region of the second and third ribs, the nature of which will be discussed later. The mechanism of such a crushing injury becomes interesting and one is puzzled to learn the extent of damage to the thoracic viscera. Haemoptysis from the third to the fifteenth day until it gradually subsided, associated with attacks of a violent, persisting cough and the expectoration of sticky, yellow, tenacious material demonstrated the presence of a bronchial fistula which, with the bulging chest mass, gave proof of the presence of an open pneumothorax and a hemothorax. Emphysema of the skin or evidences of hemo- or pneumothorax are positive signs of a fracture of the ribs.[16]

The multiple fracture of the ribs evidently tore the lungs and pleura to such an extent as to cause hemorrhage into the pleural cavity and allowing the escape of air from the injured lung into the subcutaneous tissues of the right and left neck, chest wall and abdomen. After a lapse of six or seven days the hemorrhage ceased and the rent in the lungs became sealed with pleural exudate. With laceration of the soft tissues of the anterior chest wall, the pleura protruded through the opening in the chest wall only covered by skin and a thin layer of superficial fascia.

With the attending surgeon, I was called to the bedside of the patient at the second week to observe the phenomena of this bulging mass

with reference to respiration and exact location (although I previously had examined the patient several times under fluoroscopy and had made plates in various positions on each occasion). Palpation revealed a distinct hollow in the second rib due to loss of tissue. With inspiration the mass became smaller and after expiration bulged outwards, the size of a small orange. The presence of fluid was easily detected in this bulging mass as if the contents bore the presence of a viscid, sticky material and compressed, crepitant tissue.

How long the punctured lung by a broken rib may pump air with every respiration into the tissues, I am not able to determine, although on October 12, 1931—fifteen days after the accident—the emphysematous air was slowly being absorbed and considerably less than the day of admission. Since this mass was visibly affected by respiration, the pertinent question arises as to the nature of its contents. What were the layers of tissue comprising this mass? That this external chest wall pocket communicated with the pleural cavity is very evident from the nature of the phenomena occurring during respiration. One attempt at solution would explain this pocket as a purely external cavity filled with air and fluid, that, during the height of a full inspiration with the lungs fully expanded and the thoracic cage increased in volume to accommodate the increased lung volume, the external chest wall pressure would be sufficient to compress the pocket; inversely, at the height of a full expiration, with the thoracic cage and its contents fully compressed, would permit complete relaxation upon the cavity and cause it to bulge. This mechanism is fully brought out by Fig. I—a diagrammatic cross section of the chest—and is applicable to the cause and formation of subcutaneous emphysema and pneumothorax complicating rib fracture. On inspiration the lung expands and air rushes into the pleural cavity; on expiration the lung collapses and the rent in the lung tissue is closed so that withdrawal of air from the pleural cavity becomes impossible. This phenomenon probably occurred seven to ten days following the accident. That the mass connected with the pleural cavity is obvious, in that respiration changed its form and size. If no communication of the pocket existed with the pleura, no expansion and retraction would occur other than moderate tension of an expanded chest against the wall of the cavity.

With a pyo-pneumothorax present, this bulge essentially amounted to a hernia of the lung. According to most text-books, hernia of the lung occurs most commonly in the antero-lateral part of the chest, and there may or may not be a layer of parietal pleura. In cases of long standing, because of the adhesions to the overlying tissues, the hernia may be irreducible. This hernial sac, however, was very readily reduced and held in place by a circular card board over its orifice. Lilienthal claims that in true hernia only a small amount of the lung extrudes and strangulation rarely happens as the lung tissue is so easily compressible.[17] To quote further, in a paragraph on Physical Signs: "There is a tendency for the tumor to decrease in size during *inspiration* and sometimes to protrude with ordinary *expiration;* cough will cause the tumor to become tense." This author, quoting from Sauerbruch, states that, if the reverse of this phenomenon occurs, namely bulging on inspiration and retraction on expiration, a complication of diaphragmatic injury with prolapse of abdominal viscera into the thorax and out through the chest wall may be suspected.

Comment: A severe crushing injury of the chest in a man of 42, complicated by lung hernia, three fluid level pockets, pyo-pneumothorax and extensive subcutaneous emphysema of the chest wall and abdomen results in apparent recovery, full reexpansion of the lung and closing of the hernial sac without operation. That the withdrawal of 915 cc. of pus followed by replacement of an equal amount of air and expectant treatment were sufficient to fully alleviate this patient in seven weeks following this extensive injury.

Since this writing, a message in January received from a friend of the patient, states that the bulging in the chest wall has recurred, although the patient is attending daily to his duties as an automobile mechanic. He has promised to pay a visit to his physician but has not reported up to the present time. A letter received from his wife, May 4, 1932, states that, "the bulging in his chest has given him no trouble at all and that the lump at first was the size of an English Walnut and very painful with the least pressure but now it is

flat and less tender." (Direct quotation from letter.)


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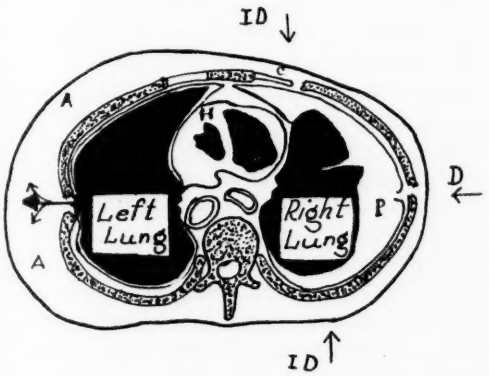


Fig. 1. CROSS-SECTION OF THORAX (DIAGRAMMATIC) TO SHOW MODE OF PRODUCTION OF PNEUMOTHORAX OR HEMOTHORAX AND OF SUBCUTANEOUS EMPHYSEMA AS A RESULT OF FRACTURES OF THE RIBS.

ID, The arrow accompanying these letters shows the mode of action of indirect force in producing fracture of the ribs; D, mode of action of direct force in producing fracture of the ribs; P, pneumothorax as a result of fracture of the rib and laceration of the pleura on right side; A, extensive subcutaneous emphysema as a result of puncture of a lung by the sharp ends of a fractured rib fragment; the triple arrow shows the mode of egress of the air from the punctured lung into the subcutaneous tissues; H, cross-section of heart; C, fracture at costochondral junction without displacement. Pneumocele or lung hernia develops by protrusion of lung through thoracic wall at site of triple arrow. (From Keen's Surg. Vol. I, p. 159, 1926.)

## DISCUSSION

Dr. H. H. Cole, Springfield: Hernia of the lung must be pretty rare, because I have seen very, very few of them and I have seen a good many lungs. The fact that the lung will follow a chest wall providing there is no external opening and providing there is no break in the visceral pleura is well known. Of course with a negative pressure inside the chest, which is a normal condition, the lung that is elastic will tend to retract away from any hole, and it seems to me that in order to have hernia there must be a break in the wall, and there must be some means of trapping the lung in that break.

I recall at the present time that Dr. Olin said no cases of hernia of the lung were seen in the last war. Perhaps a great many of them were seen, but were seen under such conditions and at such times we did not have a chance to report them. I remember having two in the wards at one time in which extensive shell fragments had torn away a portion of the chest wall, leaving the patient with open pneumothorax. The lung would protrude on cough and just the instant the strain was relaxed there was the opposite condition, retraction.

I recall one case where a rifle bullet passed through the chest in which a condition occurred which I should like to draw on the blackboard for you. When the patient coughed the lung protruded and then as the pressure was relaxed the sharp ends of the rib came together. I remember that case very distinctly because we removed an inch from the end of each one in order to get away from the danger of tearing the lung.

Recently I had a shot-gun accident in a patient seventeen years old. It was an extensive injury with an approximate area of three to five inches carried away in the side of the chest. There was a total and complete disappearance of about four or five inches of two ribs and two or three inches of the ribs above and below. We had to do a very wide debridement in order to get away from the shattered bone. The hole in the diaphragm was plugged with the top of the kidney, then the diaphragm was raised as high as we could reach and fastened to the chest wall in order to give us a closed area in which to work. After this the lung was maintained in collapse until healing took place, which we got, and the lung was pulled back up by Bottle suction until it stuck to the wall; then we went in and cleaned up the empyema. It was the toughest job I ever had to do, and one of the most lucky ones I've had. This patient now wears a pad over the area, but if he coughs there is quite a strong protrusion. Under ordinary conditions when he is not under strain, there is retraction and there is a depression you can put your hand right in. I think perhaps that could be classed as a hernia.

I personally have never seen congenital hernia of the lung. I have seen it in the diaphragm but in that case the lung collapses and usually becomes a fibrous mass without any lung tissue in it.

In the case reported I should like to ask whether there was a complete pneumothorax? My understanding it that there was.

Dr. Olin: There was a pneumothorax.

Dr. Cole: In that case I say the pressure from the trachea was transmitted through the lung directly into the chest cavity and you get a very much higher internal pressure on your cough under those conditions than you do when the lung itself is intact. That is really a hernia of the chest wall.

Dr. Harry A. Olin, Chicago: On the case I reported the injury occurred last September. The patient was written to in January, and the report given to me by a friend who said that he observed a little bulging mass during deep expiration, coughing, and so forth. I also received a letter from his wife the first part of May, in which she said the mass still bulged the size of a little golf ball, but was less painful. Of course, this patient had to resume work quite early, but from the nature of what he had, I feel quite certain that it must have been a lung hernia.

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## FACTORS IN THE ROENTGENOLOGICAL DIAGNOSIS OF NON-OPAQUE FOREIGN BODIES IN THE BRONCHI*

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It is well known that for years such men as Chevalier Jackson have warned us of the dangers of the overlooked foreign body. Cases in our own cities are known to have had negative Roentgenological diagnoses and yet have coughed up foreign bodies days or month later. Later examination of the films has demonstrated recognizable lung changes. It is, therefore, the purpose of this paper to call attention to a few of the more important factors in the Roentgenological diagnosis of foreign bodies in the bronchi and to correlate various apparently disconnected findings.

*History.* The history of the case to be examined will be of much importance whether it be positive or negative. One patient may deny any history of aspiration of a foreign body and yet will have a foreign body present in a bronchus, while another may give a history, suggestive because of suggestion by the examiner, and yet there may be no foreign body present. Cases of foreign body which have been treated as pneumonias for a week or two, have given no history or at least no positive history of aspiration.

The sudden onset of choking, while eating or while playing with small objects, is practically positive evidence of aspiration. Such an incident is usually followed by one or more symptoms, such as hoarseness, aphonia, croupy cough, wheezing and dyspnea, the severity of which depends upon several factors—the degree and extent of laryngeal or bronchial obstruction, the irritating properties of the foreign body and the mobility of the foreign body within the bronchial tree.

The time element is extremely important in the non-opaque foreign body cases. In this type we include those of vegetal origin, such as kernels of corn, peanuts, seeds, and those of animal origin, such as small bones. A very irritating vegetal foreign body may cause involvement or occlusion of one or more large bronchi within a period of four to six hours. On the other hand, a kernel of corn, with unbroken cortex, may be retained for weeks with the involvement of not more than one or two lobes.

*Physical Examination.* The physical findings by inspection, palpation, percussion and auscultation are important, particularly if made by one experienced in chest work, but time may be such an important element that a careful physical examination is impossible on account of the emergency. The Roentgenograms with history and one or two physical findings, must then be relied upon before bronchoscopy.

*Study of Opaque Foreign Body Cases.* To better interpret Roentgenograms of non-opaque cases, a study of the effects of metallic foreign bodies in the bronchi will yield valuable comparative information. Vegetal foreign bodies cause obstructive emphysema and obstructive atelectasis more quickly and more extensively than metallic foreign bodies of the same size. Therefore, the effects as evidenced by Roentgenograms will be similar whether the foreign body is metallic and opaque or non-metallic and non-opaque.

*X-Rays During Respiratory Phases.* In many Roentgenological laboratories and in many institutions, steroscopic plates are made routinely. It is true that they reveal more information than a flat plate. If such plates, taken both at the end of expiration or at the end of inspiration, do not reveal enough information for a positive diag-

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nosis, recourse should be taken to further exposures. A flat plate in the anterior-posterior position at the end of expiration, another at the end of inspiration and one in lateral position, would give more valuable information than the usual stereos.

A comparison can then be made of the findings at inspiration with those at expiration. The expansion or contraction of one side of the chest, narrowing of the intercostal spaces, fixation or depression of the diaphragmatic dome on one side, the exaggeration or obliteration of the cardio-hepatic angle, the position of the trachea and the mediastinum, are all basic in the interpretation of such Roentgenograms.

*Obstruction of Bronchi.* We know that any foreign body, whether of endogenous origin, such as tenaceous plugs of bronchial secretion, or of exogenous origin, causes a reaction in the bronchial tree by its presence. If the foreign body is small and only slightly obstructing, there will be little or no demonstrable evidence on the x-ray plate. Within a few hours, in cases of vegetal foreign body, or within a few days to weeks in metallic foreign body, X-ray evidence always appears. It is this evidence with which we are concerned.

Every foreign body lodged in the bronchi will of necessity cause either an obstructive emphysema or an obstructive atelectasis, or both conditions in different parts of the lung at the same time. Acute obstructive emphysema is usually the stage depicted early unless there is instantaneous complete plugging of a large bronchus. In the latter case, an acute atelectasis would develop as the air is absorbed from the affected lung.

*Acute Obstructive Emphysema.* If the patient is quite young a study of the case by Fluoroscopy is not of sufficient value to warrant the expenditure of the effort. In such cases x-ray plates will give the required information. A crying child or baby can be exposed at the end of the expiratory phase of the cry and again at the instant of deep inspiration. Lateral plates may be of value in very young children, but they are of more importance in older children and adults.

During *Fluoroscopy* in obstructive emphysema, the following phenomena may be observed:

(a) Both sides of the *chest* appear equally expanded at inspiration, but at expiration the involved side appears to remain more or less filled with air, the degree depending upon the extent of lung involved and the amount of air trapped.

(b) The *intercostal spaces* appear equal at inspiration, but do not diminish in width on the involved side during expiration. This fact again depends upon conditions as expressed under (a).

(c) The *domes of the diaphragm* appear about normal during inspiration, but during expiration the dome on the involved side remains descended almost to the same degree as at inspiration.

(d) The *cardio-hepatic angle* appears normal or slightly exaggerated during inspiration in involvement of the lower right lobe, but during expiration does not become smaller.

(e) The *trachea* appears pushed toward the uninvolved side during expiration, but may appear nearly normal during inspiration.

(f) The *mediastinal structures,* during inspiration, appear nearly normal unless the emphysema is marked, but appear to be pushed toward the uninvolved side during expiration.

The x-ray films at the end of expiration, at the end of inspiration and laterals, are records of the main fluoroscopic findings.

*Acute Obstructive Atelectasis.* Depending upon the degree of irritation produced by the foreign body, the amount of bronchial secretions produced, and the size of the foreign body, the partial obstruction, more or less rapidly, becomes total. Air is absorbed from the involved lung. The following phenomena may be observed during *Fluoroscopy:*

(a) The diminution of expansion of the involved lung appears most marked during inspiration. During expiration both lungs may appear nearly equal if the degree of atelectasis is small.

(b) The *intercostal spaces* appear as under (a).

(c) The *domes of the diaphragm* may appear nearly normal during expiration, but the dome on involved side appears to descend very little during inspiration.

(d) The *cardio-hepatic angle* appears diminished or obliterated during expiration in involvement of the right lower lobe. This phenomenon may appear less marked during inspiration.

(e) The *trachea* appears to be pulled toward the involved side.

(f) The *mediastinal structures* appear to be

pulled toward the involved side, most markedly during inspiration.

It is to be remembered that compensatory emphysema occurs in the uninvolved lung. This is most evident in cases of complete obstruction of more than one main bronchus and in total collapse of one lung.

Two patients within the past six months came into the hospital with only the right upper and part of the middle lobes functioning. These showed extreme compensatory emphysema.

The x-ray films made at the end of expiration, at the end of inspiration and a lateral, constitute a record of the main fluoroscopic findings. It is the careful study of these variations in chest expansion, intercostal spaces, the positions of diaphragmatic domes, the cardio-hepatic angle, the trachea and the mediastinal structures, which permit us to have a better understanding of the suspected foreign body case.

*Dislodgment of Foreign Bodies.* In obstructive atelectasis a foreign body may actually be loosened or squeezed from its bed in a bronchus by changes in pressure within the lung. Occasionally we have had a patient who, after lodging a vegetal or bony foreign body for weeks or months in his lung, has coughed it up without any untoward sequelae. These rare cases fall within the 2 per cent. of foreign bodies which are recovered by being coughed up.

Case 1. Male, aged 47 years, had influenza about 11 months ago, shortly after a ruptured appendix operation. Occasional cough and expectoration of bloody secretion followed. During the past 4 months hemorrhages from the lung occurred, at times amounting to one-half cup. When patient would lie on involved side bleeding would start.

X-ray examination showed an obstruction of upper right middle lobe, with no apparent abscess. The suggestive diagnosis was obstruction of right middle main bronchus, due either to a tumor or a foreign body associated with granulations. A bronchoscopy was decided upon. The next day after consultation on the films, the patient coughed up a small bone with debris, fibrin, etc.

Occasionally foreign bodies will be coughed out of the involved lung into the trachea and then fall back into the normal lung. These cases are easily fatal.

Case 2. Child, aged 3 years, was treated for two weeks for what was thought to be pneumonia. Patient had had coughing spells and an irregular temperature, 100 to 103 degrees. Improvement toward the end of the first week was followed by higher temperature, weakness and much coughing during the second week. Without warning, on the 15th day of the disease, a violent coughing spell developed and patient became markedly cyanotic. The pulse rate jumped to around 150 and respiratory rate to about 52.

Consultation and x-rays revealed a beginning collapse of the entire left lung. White blood count was 48,000. Twenty-four hours later, physical examination and X-ray revealed a total collapse of entire left lung, an atelectasis of the right lower and part of the middle lobes, and compensatory emphysema of right upper and middle lobes.

A diagnosis of foreign body was made before bronchroscopy. The foreign body, vegetal in origin and very irritating to the bronchial mucosa, was evident from the high white count and the fact that it had lodged in the right lower bronchus and had been coughed into the trachea and fallen into and completely plugged the left main bronchus. Then the parents remembered that the patient possibly had had a kernel of corn in its mouth two weeks before.

Bronchoscopy was performed. The left main bronchus was found collapsed and a kernel of corn removed from it. Thick tenacious purulent secretion was aspirated from the right lower and middle main bronchi. Before the patient had left the operating room, air filled the left lung and some air was present in the right lower. X-rays demonstrated the latter findings four hours later.

*Additional Factors.* In foreign body interpretations, there are many additional facts which must be borne in mind. There may be more than one foreign body present. If the case does not recover rapidly enough, another Roentgenogram may reveal evidence of a second foreign body.

A foreign body may shift from one bronchus to another and thereby change the symptoms and Roentgenological findings. Tenacious secretion, as much a foreign body as the actual offender, may be the cause of many peculiar irregularities in physical and Roentgenological findings.

It should be borne in mind that the Roentgenological evidence of acute obstructive emphysema is accentuated toward the end of expiration and that of acute obstructive atelectasis, toward the end of inspiration.

Case 3. *Obstructive Emphysema* due to metallic foreign body.

A girl, 15 years of age, aspirated a straight pin five days before admission to the hospital. It had not caused any discomfort. An early partial obstruction. Caused a mild obstructive emphysema as seen by X-ray. The pin was later removed by bronchoscopy. (Pins cause so little reaction in the bronchial walls that weeks or months or longer may elapse before marked lung changes become visible by Roentgenograms.)

Case 4. *Obstructive Emphysema* due to peanut.

Child, eight years of age, choked four days before admission while eating peanuts. A loud expiratory wheeze, physical findings and X-ray examination led

to the interpretation of acute obstructive emphysema, a "ball-valve" type of obstruction of the right lower main bronchus. At bronchoscopy a peanut kernel with part of the husk attached was removed from the right lower main bronchus.

This child, eight years of age, had a peanut in its bronchi for four days with only a partial obstruction. The bronchial reaction is not as marked at this age as it is in very young children.

Case 5. *Obstructive Emphysema* due to peanut.

Baby, sixteen months of age, choked 36 hours before admission. Spells of violent coughing followed. Physical findings and the x-ray evidence of an acute obstructive emphysema led to the diagnosis of a foreign body plugging the left lower main bronchus. A peanut was removed from this site at bronchoscopy.

Case 6. *Obstructive Emphysema* involving both lower lobes.

Child, aged 3 years, choked while eating an apple, about five hours before admission. Physical and Roentgenological examination demonstrated an acute partial obstruction of the right and left lower main bronchi, causing an acute obstructive emphysema. Because the family doctor had found involvement in the left lower lobe three hours before admission, the conclusion was reached that the foreign body must be on that side and not on the right. Bronchoscopy revealed an abundant thin secretion filling both lower main bronchi. A piece of apple was found plugging the left lower main bronchus.

Such a foreign body is so very irritating to the bronchial mucosa that the patient could drown in his own secretions within 18 to 24 hours.

Case 7. *Obstructive Emphysema* entire left lung.

Child, aged 4 years, aspirated a kernel of corn about 4 hours before admission. Examination then revealed an obstructive emphysema of the entire left lung and the mediastinum pushed to the right. At bronchoscopy a kernel of corn and much thin bronchial secretion was removed from the left main bronchus.

The reaction was considerable in this case considering the brief sojourn of the foreign body. As soon as the secretion would have flowed over into the right main bronchus and filled the lower branches, the x-ray evidence would have been considerably changed.

Case 8. *Obstructive Emphysema* of entire right lung.

Child, aged 2 years, while sitting on the floor, was found choking for no evident cause. The dad thought a nail was missing from the table. An hour later, x-ray revealed an eight-penny nail partially plugging the right main bronchus. At the hospital, an hour later, the obstructive emphysema was still more marked. The nail was removed by bronchoscopy. Almost at once the areation and the mediastinal structures were normal.

Case 9. *Obstructive Atelectasis and Emphysema* in same lobe.

A child, 2 years of age, had been treated for 10 days for what was supposed to have been pneumonia. Physical and Roentgenological findings demonstrated both an atelectasis and an emphysema in the right lower lobe. At bronchoscopy a kernel of corn and much tenacious bronchial secretion was removed from the lower right main bronchus. At the end of 2 weeks the lower lobe was clear.

Case 10. *Obstructive Atelectasis and Emphysema* in different lobes simultaneously.

A child, 2 years of age, stumbled while eating peanuts, about 14 hours before admission. Two hours later breathing became difficult. The family doctor, on physical and x-ray examination, found pathology in the right middle and lower lobes. Ten hours after onset patient had a violent coughing spell and became cyanotic. Examination at the hospital 14 hours after the onset, revealed that the entire right lung was completely obstructed and the lower left lobe partially obstructed.

At bronchoscopy much secretion was aspirated from the trachea and main bronchi. After clearing the lower left main bronchus, a kernel of corn was removed. Air then entered this lobe. After aspiration of much secretion from the entire right main bronchus, air rushed into each lobe.

This is another case illustrating first, that vegetal foreign bodies are highly irritating in very young children; second, that the physical findings as well as the X-ray findings will vary with the pathology and, third that occasionally foreign bodies will shift from one bronchus to another thereby radically changing the pathology and, therefore, the physical and X-ray findings.

A large number of other cases might be summarized but they represent variations or complications of the types mentioned above.

## CONCLUSIONS

1. A Roentgenological study of the effects of opaque foreign bodies should be made in order to better interpret similar effects caused by those which are non-opaque.

2. It is not advisable to make a negative X-ray report in a suspected foreign body case on one X-ray examination only. Bronchial changes in such cases may be rapid or slow but they are always definite.

3. All vague or undiagnosed chest conditions should have suspicion cast upon them and have foreign body ruled out.

4. The Roentgenologist is the right hand man of the Bronchoscopist. The latter cannot function without the former.

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## DISCUSSION

Dr. Henry W. Grote, Bloomington: I know of nothing to add to this paper, but I would just like to stress the radiological field in the possibility of emphysema, also the point of lack of motility of the diaphragm on the affected side. Then also the repeated fluoroscopic examinations. The fact that so many of these examinations, or the great majority of them, are more or less a failure, is because of fear on the part of the child. If this is repeated two or three times, the child gets confidence and it is easier to make the diagnosis.

This is stressed because of the fact that non-opaque foreign bodies are so often diagnosed on negative findings. I do not think that in the average case a diagnosis should be made positively on non-opaque foreign bodies without the aid of bronchoscopy.

Another point that I would like to bring out is the possibility of the foreign body pneumonia being mistaken for infectious pneumonia.

I appreciate this paper very much. I am sorry to say that in nearly all of the films shown, regardless of where they are shown, I rarely see a good film demonstrating an emphysema. I wish that some of us could develop a technique to bring that out more clearly in these cases.

Dr. Watkins, Bloomington: I think that Dr. Sneller gave a very excellent paper. One point I think should be emphasized is the importance of the roentgenologist and the pediatricians and the internists. Probably a plumber could do the work of the endoscopist if he had the tools, but he could not find out the diagnosis from physical findings.

Dr. George Woodruff, Jr., Joliet: Dr. Sneller presented an excellent paper. One thing, of course, that is unfortunate, is that we have so few of these cases. The ordinary man doing ear, nose and throat bronchoscopy sees so few. The ideal thing would be to have one man in a community do this work, unless it is in a large community where there are enough cases. The same applies to the x-ray man. I think the x-ray man has to keep his hands in these cases to get the best results. These sort of cases should be handled by a bronchoscopist, x-ray man or internist who see these cases all the time.

Dr. Perry Goodwin, Peoria: I think one point that is important is the cooperation of the radiologist with the bronchoscopist. Dr. Sneller and I worked on quite a few of these cases, and as far as the radiologist is concerned, he does not see so many of those unless the throat man has them referred, and a good many of our cases have been indefinite, at the same time the symptom is not accounted for. We would read them for a possible non-opaque foreign body.

Another thing that should not be lost track of, and it came to my attention a few days ago, is when there was a history of a patient swallowing a pea or being choked on a pea. The patient was referred with the history of the pain on the right side, low down, with definite rales, and the area suspected was on the left side of the chest film. I think Dr. Sneller will bring that out in his discussion, that you may have a foreign body located in one bronchus and with a cough it will be shifted over to the other side and give you signs on the opposite side.

Dr. Charles D. Sneller, Peoria: It is very interesting in the history of non-opaque foreign bodies that many of these cases can be overlooked when there is apparently definite history, or on the other hand, when there is no history.

Frequently children choke on food or whatever they may have in their mouths. You never know just when there is going to be a lodgment of a foreign body somewhere, either in the esophagus or in the lung.

Vegetable foreign bodies can produce a simple picture early, but a little later the picture can be so complicated that you never think of a vegetable foreign body causing the symptoms. At least two of these selected cases illustrated that.

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## PROGNOSTICATION IN HYPERTENSIVE ARTERIAL DISEASE.*

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That hypertensive arterial disease is a serious and frequent source of disability and death is well known. The increased mortality among hypertensive individuals, in contrast to those with normal arterial tension, is clearly recognized by life insurance underwriters and others. Vital statistics reveal that the group of diseases designatd by the inclusive term "cardio-vascular-renal disease" heads the list of causes of death today. It has been conservatively estimated[1] that approximately 140,000 people die annually in the United States as a result of hypertensive disease. In sharp contrast to such a pessimistic outlook for the hypertensive patient is the fact, frequently observed by all of us, that certain patients may live many years with little impairment of efficiency despite marked arterial hypertension. The problem of prognostication must be considered not only on the basis of prognosis of the group as a whole, but for individual specific instances. The patient has relatively meager interest in the fact that the average duration of life of hypertensive individuals is much curtailed; his natural interest is centered upon his own individual problem.

The individual prognosis in hypertensive disease must be based upon several factors, all of which are to some degree inter-related but which are also independently variable. As slightly more than half of the deaths attributable to hypertensive disease result from cardiac failure,[2] the factor of the cardiac reserve warrants careful consideration. Second among the significant factors is the status of the renal reserve. As successful curative therapy must inevitably depend upon etiology, the etiologic background must be considered; no two cases of hypertensive disease are necessarily due to

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*Read before Section on Medicine, Illinois State Medical Society at Springfield, Ill., May 18, 1932.

*From the Department of Medicine, Rush Medical College, the University of Chicago.

the same forms of arterial injury. Certain etiologic factors are amenable to therapy whereas others are not. Of great significance is the degree of progression of the pathologic changes in the arteries; the extent of permanent irrevocable damage. Evidences of more or less extensive sclerotic changes in the arteries of vital structures such as in the cerebral and/or coronary vessels definitely affect the prognosis. Lastly, one must consider coincident complications and the effect of age.

The factor of cardiac reserve is of vital significance in every instance of hypertensive disease. It is a justified clinical concept to assume *a priori* that in every instance of long standing arterial hypertension some cardiac damage exists. Although there may be rare exceptions to such an attitude, they are so rare that far fewer errors will be made if this axiom be constantly kept in mind. The sources of cardiac injury in hypertensive disease are multiple. Of major importance is the abnormal and continuously increased burden of cardiac work. Because of the continuously elevated peripheral resistance to the circulation, as evidenced by increased diastolic tension, the left ventricle is constantly being required to exert itself to the utmost; it is as though the heart were being asked to work as it does when the host is climbing stairs; but must do this every minute of every hour, 24 hours a day. It is thus not surprising that left ventricular fatigue eventually becomes exhaustion and cardiac decompensation occurs.[3] The site of hypertensive disease is in the media of the smaller arterioles; the arterial musculature.[4] Embryologically, structurally and functionally the myocardium is but a specialized part of the vascular media, just as the endocardium is continuous with and part of the endothelial layer of the vascular system. The myocardium is thus subject to and vulnerable to the same sources of injury which have initiated the arteriolar disease.[2] Myocardial injury is further aggravated by local malcirculation and malnourishment because of the impaired coronary circulation. Such asphyxial embarrassment is, of course, enhanced by any anemia or respiratory difficulty.[5]

Almost innumerable attempts have been made to find a satisfactory numerically measurable test of cardiac efficiency. Indirectly many of these, such as determination of the vital capacity, or the "exertion" tests,[6] give some evidence of the cardiac and circulatory efficiency but none have proven wholly satisfactory. MacKenzie[7] long since emphasized that the truly logical method of measuring the *heart reserve is by the response to increased effort.*[2, 8] The principle of determining reserve strength by the response to increased effort is applicable not only to the heart, but equally well to any other structure such as the kidneys, liver, automobile or bank. In clinical practice the patient's history anent the degree of exertion which induces dyspnea is probably the best guide to the status of the cardiac reserve[9]; it is normal for violent physical effort to result in anoxemia and dyspnea, but the occurrence of dyspnea following lesser and lesser exertion parallels diminishing cardiac reserve. Early during the course of hypertensive disease[2] the heart is sthenic, slow and powerful, but gradually, as the increasing burden overtakes the compensatory hypertrophy, the heart becomes asthenic, rapid and readily exhausted. The prognosis for any specific instance will depend greatly upon the cardiac reserve. Electrocardiography does not yield much useful prognostic information in hypertensive heart disease[10] unless coronary disease is noteworthy[11]; such latter information is, of course, of great significance.

Not infrequently there exists renal functional impairment in hypertensive disease. In years past it was long assumed that arterial hypertension invariably resulted from renal impairment; this is clearly not true.[2, 12] It has also been erroneously assumed that the hyperpiesis is a compensatory phenomenon required to enhance the renal circulation and therefore that reduction of the arterial tonus further diminished the renal efficiency. The renal circulation is less effective when marked hypertension exists than when the arterial tension is reduced to normal levels; it has been repeatedly demonstrated[2, 13] that gradual, slow reduction of the arterial tension, as with bismuth subnitrate,[14, 15, 16] results in notable improvement of the renal functional efficiency. In all probability much of the renal impairment discovered in hypertensive patients is secondary to the renal circulatory inadequacy.

Albuminuria is not a criterion of impaired renal efficiency; proteinuria is probably largely,

if not entirely, of extra-renal origin.[17, 18, 19] Nor is the absence of protein in the urine adequate evidence of normal urinary function.[2] There is no time here to attempt any discussion of the various clinical methods available for studying renal secretory efficiency.[2, 20] The fundamental principle of measuring *reserve* by noting the response to increased effort is applicable here. The greatest portion of renal work is done in concentrating the urine. It is much more work for the renal tubules to secrete a small volume of highly concentrated urine than a large volume of dilute urine. Thus renal effort may be increased either by increasing the solutes to be secreted or by diminishing the volume of water (solvent) available. The urea concentration test of Maclean and de Wesselow[21] follows the first idea, and the renal concentration test by deprivation of water[22] illustrates the latter (Volhard-Fishberg). In clinical practice[2, 23] the renal concentration test has revealed evidence of diminished function earlier than other methods, unless the far more cumbersome urea clearance test[24] be employed. Evaluation of the renal functional reserve[2] is necessary for proper prognostication.

Hypertensive disease is due to a great multiplicity of factors; each clinical instance may be due to different sources of vascular irritation and injury. In the great majority of cases several synergistic factors are superimposed. The initiating etiology of hypertension may be defined as "anything which injures or irritates the vascular structures to produce the response of hypertonia."[2] These factors are many. Of prognostic import is the fact that certain etiologic factors are amenable to therapeutic correction, whereas others are not. For example, foci of infection such as oral sepsis, plumbism, arsenical intoxication, thyrotoxicosis, unwise dietary habits, obesity and certain endogenous intoxications are all amenable to therapy, but other factors such as hereditary influences, past infections and intoxications since gone, inherent emotional and vasomotor instability, and foci of infections whose correction may be dangerous, are not amenable to therapy and are frequently irrevocable. To properly prognosticate, an understanding of the etiologic background is necessary. It cannot be too often reiterated that curative therapy must rest upon an etiologic basis.[2]

These various and numerous factors act to *initiate* the progressive changes which constitute the pathogenesis of hypertensive disease. The real site of the disease is in the arterioles; hence the error in the term "high blood pressure" which misplaces emphasis upon the blood. Elevation of the arterial tension is a result of arterial disease; a symptom. The pathogenesis of hypertension is best illustrated diagramatically.

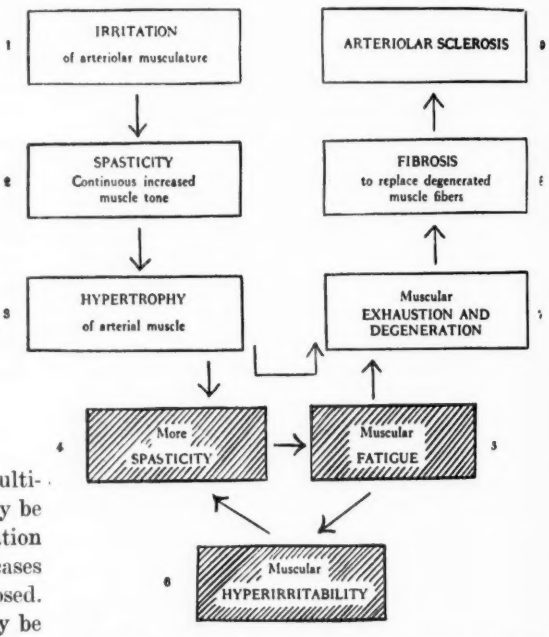


Chart 1. Probable pathogenesis of hypertensive arterial disease. The shaded portion of the diagram represents the vicious circle of fatigue, the "perpetuating factor" in hypertension. Up to the point of muscle degeneration (step 7) the processes are reversible; beyond that point irreparable. After Stieglitz (footnote 2).

This conception of the pathogenesis of hypertension[2] has significant bearing upon the problems of prognosis, for much will depend upon at what phase in this slowly progressive process the patient is seen. Hypertensive disease shows no inclination to spontaneous remission or to improvement; left alone the process is slowly but persistently progressive, even though the original initiating factors may have ceased to be operative. This tendency to constant pro-

gression we believe to be due to the "*perpetuating factor*" of fatigue illustrated in the diagram.

As illustrated in the diagram, the progressive changes in the arteriolar media are at first reversible, as in a reversible chemical reaction, but later become irreversible. Spasticity is relaxable, hypertrophy of muscle subsides with lessened use, fatigue is amenable to the influences of rest and hyperirritability may be diminished. Once the progression has reached Step 7 in the diagram, where the medial muscle cells are exhausted and replacement with collogenic connective tissue occurs, the changes are permanent, irrevocable, irreparable and non-amenable to therapy. Scarred, fibrotic vessels are not relaxable and thus the *best* therapeutic results which may be then anticipated is arrest of the progression. It is thus obvious that knowledge of the extent of arteriolar change is essential to proper understanding of the prognosis.

How may the extent of sclerotic change in the arteriole be determined? Sclerotic arterioles remain fixed and the arterial tension is not labile and variable as it is when arteriolar spasticity predominates. Persistent diastolic hypertonia is more indicative of sclerotic change than transient, although excessive, hypertension, for the variability of the diastolic tension constitutes an effective criterion of the degree of arteriolar spasticity. In the majority of clinical instances, however, there exists both an element of spasm and sclerosis. It is possible to know whether or no a permanent reduction of the arterial tension may be anticipated[25] after a few weeks of adequate therapy [2, 13] but the patient is anxious for a much more immediate answer to the inevitable query "What may I expect?"

The degree of temporary relaxability of the arterioles may be readily and rapidly measured and the degree of permanent fibrotic scarring estimated. As is well known, the soluble nitrites cause a marked, rapid but transient relaxation of the arterioles and thus temporarily reduce the arterial tension. It is just because of the transient nature of this vasodilation that the soluble nitrites are relatively useless in the management of hypertensive disease, except in the acute emergencies such as angina pectoris or cerebral vascular spasm.[2] For the purposes of observing the degree of relaxability of the arterial system, however, the soluble nitrites are invaluable.[18] For several years we have used amyl nitrite for this purpose.

The technique of the amyl nitrite test of arteriolar spasticity is very simple. With the patient in a comfortable position, either sitting or lying, the arterial tension is determined. The patient then inhales deeply three or four times of a perle of amyl nitrite while repeated, rapid, observations are made of the blood pressure. As the pressure falls very rapidly, it is essential that these readings be made with the greatest dispatch. In approximately 30 to 50 seconds the tension begins to rise again and further determination of the arterial tension are unnecessary, although they may be of interest.[26] The significant observation is the *minimum diastolic tension* observed after the inhalation. This minimum occurs very soon after the fall begins and usually comes shortly before the intense facial flush appears. We have now employed this valuable test in 180 cases of hypertensive disease, and although the sense of fullness in the head, tachycardia and facial flush may be temporarily distressing, we have never observed any ill effects from the procedure. In view of the fact that amyl nitrite and related compounds have been used for many years in angina pectoris and allied states without evidence of detriment, untoward effects are not to be anticipated.

As is true of any clinical test, the interpretation of the results is the most important element. The significant observation is the approach of the diastolic tension to or below normal. Let us consider, for example, four patients of about the same age with similar cardiac and renal conditions and similar degrees of hypertension. The results of the amyl nitrite test are shown in the table below:—

| | A | B | C | D |
|---|---|---|---|---|
| Tension before test: | 240/150 | 240/130 | 205/135 | 195/130 |
| Minimum tension after inhalation amyl nitrite: | 205/120 | 140/110 | 145/100 | 120/80 |
| Maximum normal diastolic tension: | /90 | /90 | /90 | /90 |
| Approach of diastolic toward normal: | 50% | 50% | 80% | 100% |
| Estimated degree of arteriolarsclerosis: | +++ | ++ | + | 0 |
| Tension after about one year observation and therapy: | 205/120 | 200/114 | 148/95 | 146/86 |

These four cases are taken as typical illustrative examples from an extensive series. Case A was a man of 50 who died of cerebral hemorrhage 15 months after the test, Cases B, C, and D were women of 52, 48 and 50 years respectively. At first glance the four cases present similar findings, but after the amyl nitrite test the real differences become quite obvious.

The clinical course of patients under therapy for hypertensive disease has confirmed the impressions gained from the amyl nitrite test in more than 90% of the cases; when a poor response indicates extensive sclerotic changes in the arterioles, no great clinical improvement can be anticipated with any form of therapy and none occurs. Should the amyl nitrite test indicate that the hypertension is almost purely of a spastic nature, proper therapy with eradication of any and all etiologic factors should and usually does result in splendid and essentially permanent therapeutic results.[25] To discuss just what constitutes proper therapy is impossible here. It should be reiterated, however, that late in the pathogenesis of hypertensive disease the arteriolar changes are permanent, irrevocable and irreparable, whereas earlier spasticity is relaxable and arteriolar fatigue is amenable to rest.[14, 16, 25]

The sources of error in this test are not many, although clinical judgement is, of course, essential to intelligent interpretation of the observed data. Of the greatest importance in carrying out the test is speed in making the readings of the blood pressure; it may occasionally be advisable to disregard the systolic tension so that readings may be made more rapidly. This test reveals the *average* relaxability of the arterioles of the body and does not reveal whether or no localized sclerosis exists in the cerebral, retinal or coronary vessels. Retinoscopy, with its direct inspection of the retinal arteries, is of considerable value in determining the extent of retinal and cerebral sclerosis. Frequently, but by no means invariably, the retinal findings of angiosclerosis parallel the data of the amyl nitrite test. Arteriolarsclerosis does not progress at the same rate in all the arterioles of the body.[27] For example, in one clinical instance the fundi were reported as normal by the ophthalmologist, although the amyl nitrite test revealed extensive sclerosis (185/120 falling to a minimum of 148/110). The converse may also occur. Failure to obtain good therapeutic results in the more purely spastic phase of hypertensive disease usually means that some active etiologic factor has been overlooked or is non-amenable to therapy. The status of the coronary circulation is not revealed by the amyl nitrite test; electrocardiography may or may not assist in detecting coronary sclerosis.

Associated or coincident complications such as diabetes mellitus, thyrotoxicosis, rheumatic carditis, anemia, plumbism, luetic aortitis and the like alter the prognosis of hypertensive disease. The effect of such coincident disease conditions is purely an individual problem and generalizations are valueless. Age is not of major importance, except inasmuch as it affects the normal life expectancy.[2, p. 143] Many instances of hypertension in older patients are purely spastic, whereas extensive irreparable sclerotic changes are not infrequently encountered in patients in their thirties, especially among those women in whom pregnancy has exacerbated and accelerated a pre-existent renal and/or vascular disease.[23] The duration of the hypertensive disease, when it is known, is a factor to be considered. Unfortunately it is frequently impossible to judge the duration of this disease, because of its asymptomatic early course. The rate of progression is not uniform.[4]

## RECAPITULATIVE SUMMARY

Prognostication in individual instances of hypertensive arterial disease must be based upon a number of independently variable factors. The cardiac and renal functional reserves are important. Whether or no the specific initiative etiologic factors are amenable to therapy is significant. Of the greatest importance is a careful investigation of the degree of arteriolarsclerosis present. This may be estimated in part by ophthalmoscopic examination and also from the results of the amyl nitrite test. Spastic arterioles are relaxable, but fibrotic sclerotic vessels represent a point in the pathogenic progression where the processes are irreversible. Transient arterial dilation with the soluble nitrites, while being of little or no therapeutic value in hypertensive disease, has great prognostic value: the degree with which the diastolic tension approaches normal may be taken as a

quite reliable criterion of the relaxability of the arterial system. The progression of hypertensive disease is divisible into two phases: early hypertension due to arteriolar spasm, and later arteriolarsclerotic disease. These two phases do not constitute separate entities but merely stages of development of a single progressive disease, and in clinical practice the two frequently overlap.

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## DISCUSSION

Dr. Samuel J. Lang, Chicago: This is an interesting method of approach that Dr. Stieglitz has outlined. However, we must interpret blood pressure changes critically and seek to differentiate spontaneous variations from those due to therapeutic measures. It is conceivable that this might be a good method for classifying various stages or types of hypertension. Most of us know that in hypertensive subjects the systolic blood pressure varies on an average of 38 to 40 millimeters, depending on the types of patients with whom we work, and that the diastolic blood pressure varies from 20 to 25 millimeters. Ayman believes that the diastolic pressure varies more than this and has also shown that a prolonged rest period preceding the reading of pressures is necessary for accurate results.

Along with these spontaneous variations there are, undoubtedly seasonal variations. We have recently shown in a study of 40 patients that there is an average seasonal variation of 30 millimeters of mercury in the systolic pressure—that is, during the warmer seasons the pressure tends to be lower.

Again the question of hyperventilization must be considered in this study. The process of deep breathing in itself produces a fall in blood pressure at times.

I should like to ask Dr. Stieglitz what consideration to the variability factor and the consideration of the hyperventilization factor he has made, and whether the various age groups—that is, whether older persons who presumably have greater extension of arterial sclerosis —respond differently from the younger groups.

Dr. Edward J. Stieglitz, Chicago: In reply to the question: we did not emphasize the spontaneous variations which we know occur partly because we did not have time. The readings as stated on the chart as one year later were the average readings over a period of perhaps six weeks, taken approximately a year later. They were not single readings, they were the average readings, which I feel makes them more significant.

Age does not figure particularly in predicting whether this or that patient has extensive sclerotic changes. The most marked fall in the arterial tension thus far noted following inhalations of amyl nitrite was observed in a woman of seventy-two. Her tension fell from 190 systolic to 105 systolic. We may see extensive sclerotic changes with very little response to vasodilation in young individuals.

The effect of hyperventilization is to be considered but at least it is more or less uniform in all instances, whereas the response to the specific drug, the volatile nitrite, is not uniform in all instances.

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# THE SAFEST CATARACT OPERATION, WITH REFERENCE TO ASTIGMATISM, FOLLOWING A CORNEAL CONJUNCTIVAL SUTURE*


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The safest cataract operation is the one chosen by the surgeon which in his experience seems to be indicated by the temperament of the patient and the pathology of the cataractous eye. To any type of operation selected for senile cataract, I feel an additional sense of safety is secured by the presence of a suture in place before the incision is made. This suture stands by, for instant service in complications, such as protrusion of vitreous, and

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permits the surgical closing of the incised wound.

I shall not review today all the various sutures, conjunctival, and others used, nor comment on the contemporary interest in closing the cataract incision. The suture I use was not devised with reference to the Kalt or Liegard sutures, nor is the fundamental idea, or technique the same. The prompt healing of the cornea by trauma from foreign bodies, as seen in industrial accidents, encouraged me to introduce a thread within the substance of the cornea itself. My idea is to coapt the opposing surfaces of the incised wound by placing the cap like cut cornea on the sclera with a firm mattress suture. The stitch is placed horizontally in both the cornea and conjunctiva parallel to the tangent of the limbus. The upper thread passes beneath the conjunctiva, but not in the sclera, being three millimeters from the limbus and three millimeters in length. The thread in the cornea is two millimeters from the limbus, two millimeters in length and lies in the outer third or half of the substantia propria of the cornea. The center of the threads is approximately at the apex of the incision. The needle is a curved Kalt, or venous needle, and the thread triple O black silk. I find a slightly heavier sharp cutting needle with larger eye, and not so fine a thread easier to apply and as well tolerated. The needle and thread pass more smoothly if lubricated a bit with vaseline. The needle is introduced in the cornea at right angles and made to penetrate within the cornea. The length of the thread within the cornea is determined by the depth of the original penetration and the curve of the needle. If the length of the stitch is too short another stitch may be taken in the cornea. Scratching and pricking of the surface of the cornea may heal with a visible scar. It is not easy to see the healed line of the thread in the substance of the cornea. There has been no trouble with the healing of the cornea. The tied thread has not disturbed the conjunctiva nor the eye after the operation. If the conjunctiva is very thin the outer surface of the sclera may be included in the conjunctival stitch. Inasmuch as the suture is taken before the operation the firm pressure of the fixation forceps is not objectionable. The surgeon, or his assitant, may select either hand or position on the side of the patient he wishes in taking the stitch in the cornea or conjunctiva. The thread is looped well out of the field of the incision. The loop may be shortened after the incision and the surgeon may proceed with his choice of cataract operation, with or without a conjunctival flap.

With the thread well secured in the cornea it may be used to raise the cornea and one can operate in an open field. This has the advantage of direct inspection of the anterior chamber and facilitates iridectomy or separation of posterior synecheia before extraction of the lens. In tying the suture a double loop is taken first, followed by a single loop. The tie usually falls on the cornea with the smooth side on its surface and not on the line of the incision. The iris may be replaced after the suture is tied. With the wound approximated by the suture one may include as a part of the operation needling of the posterior capsule. This corneal conjunctival suture includes the usual advantages claimed for other sutures plus, by firm closure, some maintainance of intraocular pressure. My habit is not to disturb the eye for five days. The suture may be removed then, though I usually wait a week. I have seen the thread left in the eye two weeks though there is no advantage in that. If the tissues are too senile to heal within a week the contraindications for operation may not have been seriously considered.

A direct translation of Liegard's description of his and Kalt's suture from the Annales d' oculistique, 149: 119, 1913, reveals the idea and technique of their sutures. Kalt's sutures include a vertical stitch (point) in the cornea and a transverse stitch (*point*) in the episclera. Together, they made a T. Neither the vertical nor the horizontal branch is more than one millimeter in length. The vertical branch stops exactly at the junction of the transparent portion of the cornea with the sclerotic portion. The horizontal branch traverses the opaque portion as close as possible to the cornea. An interval of half a millimeter is ample to permit the passage of the knife.

To attain this result, the needle, curved in shape, is seized by its middle portion and the point is implanted perpendicularly to the membrane, the cornea and the episclera which it

is to traverse. The needle is introduced with little abrupt movements; when it is firmly engaged, it is lowered suddenly 90 degrees and one tries to bring out the point, taking in as little tissue as possible. There is no fear of passing through either the cornea or the sclera, with the exception of the sclera of children, in the case of which the unwarned operator is sometimes surprised by penetration into the anterior chamber. If this should happen, it is sufficient to withdraw the needle slightly and finish by executing the brusque movement downward as indicated.

The difficulties of the technic may be stated briefly as follows:

1. The vertical stitch in the cornea is executed by passing the needle from below upward. The affixing forceps (*prince a' fixation*) seizes the episclera near the limbus at the level of the vertical diameter. When one is operating on a right eye, the operator, holding the needle holder in his right hand, stands on the right of the patient. In this position, one has no point of support in executing the necessary movement of rotation on introducing the needle.

This absence of a point of support is the cause in many operators of a tremor which makes the first act extremely complicated: this is the reason for the difficulty in pricking at an exact point, of penetrating a tissue as resistant as that of the cornea, of tunneling in a perfectly vertical direction and of bringing out the point of the needle exactly at the junction of the sclera and the cornea.

Often, besides, either because the needle is not sharp enough (pique mal—literally, pricks badly) or because the patient is not docile, to traverse the corneal laminae it is necessary to exert counterpressure with the fixation forceps, so that one, as one might say, involuntarily, draws the conjunctiva in front of the limbus, and the point of the needle, on emerging, pierces it and thus creates a real complication to section with the knife.

In most cases, the effort demanded determines either a small amount of subconjunctival edema or a small hematoma at the site of fixation, which makes the correct execution of the second act difficult.

When one is operating on a left eye, the operator must place himself at the right of the patient (the penetration of the needle is from below upward), and in this position there are added to the difficulties enumerated for the right eye, the extremely embarrassing nasal projection. The suture has to be made downward, as when one is operating on the base of a cavity.

2. The episcleral suture point is horizontal. One places oneself at the head of the patient, the hand supported on the forehead: for the right eye, one introduces the needle lateromedially; for the left eye, mediolaterally.

Here the difficulty arises from the projection of the superior orbital border: for fear that the patient will not be docile, that he will not understand well how to look down, that he will make brusque movements of elevation of the globe, one is forced to take the needle out and reintroduce it a number of times. Most often, as we have stated, a small edema swelling occasioned by the forceps in executing the first suture causes much difficulty in taking in sufficient of the episclera; one is deceived, on the other hand, as to the thickness of the tissue, with the result that one takes up an amount of sclera that proves too resistant for the fragility of the needle.

A final difficulty is provided by the knot itself. When the suture points are too far apart, one is surprised often to see, on the occasion of movement of the eyelids, the first tying loosen while one is busy with the second, so that the completed knot is extremely loose and consequently of little use.

I have thought that most of the difficulties enumerated could be suppressed by a slight modification of Kalt's technic.

For this, one must use a thread armed with two needles and perform the suture by making two exactly horizontal, parallel tunnelings in the cornea and in the episclera.

Thus one would avoid the troublesome projections, the nose and the superior border of the orbit, and, especially, one would have constantly a solid point of support, in the cheek. At the same time, the fixation, for both acts of the operation, would be at the same point, at a site where the small traumatism caused by the forceps could cause no difficulty during the rest of the operation.

The technic that Liegard uses is as follows:

1. Right eye: One places oneself at the

right of the patient. The fixation forceps held in the left hand seizes the conjunctiva and the episclera, near the limbus superiorly and laterally, toward 11 o'clock. The right hand, armed with the needle holder, supports itself firmly on the cheek.

The first needle is forced into the cornea a little medial to the vertical meridian. It digs a little horizontal tunnel in the corneal tissue and emerges a little lateral to the vertical meridian.

This little tunnel is made as close as possible to to the limbus, but at first no inconvenience will be caused by leaving between the two tunnels a space of about one millimeter for the passage of the knife.

Without changing position, the fixation forceps still in the same place, one next seizes the second needle and causes the point to penetrate mediolaterally, and close to the limbus one executes a second tunnel in the episclera, the orifices of entrance and emergence of this tunnel being so far as possible in line with those of the tunnel in the cornea.

For this second suture point, it is an important recommendation to make it exactly horizontal. If the needle is introduced obliquely superolaterally, the counter-pressure exerted by the forceps is exerted falsely and it is extremely difficult to make the needle penetrate.

2. Left eye. One places oneself at the right of the patient. The fixation forceps seize the conjunctiva superomedially, toward 11 o'clock.

The right arm of the operator, in a manner envelopes the face, and the right hand, armed with the needle holder, supports itself on the left cheek.

The first needle penetrates the cornea horizontally, from without inward (lateromedially): in the same way, the second needle is introduced horizontally into the episclera, from the temple toward the nose.

Finally, to avoid loosening of the knot, I am in the habit of making a surgical knot (i. e., a double tying, following by a single tying), which has the advantage of not slipping while one is executing the final loop.

The suturing finished, one has an O suture, extremely firm.

When one has done the T suture, one is surprised at the ease with which the O suture is executed.

In brief, the slight modifications that I have indicated have for their aim the facilitating of a procedure that I believe constitutes real progress in the operation for cataract. In my opinion, it does away with the greater part of the difficulties of Kalt's method, and I am persuaded that they will render a service to colleagues who have seen the advantages of the suture and who have not introduced it into their practice because of the very certain complications with which it is associated.

The foregoing is my more or less literal translation of Liegard's article.

Sutures are claimed to permit healing of the cut surfaces by first intention and as the wound cannot gap this permits more freedom of movement by the patient. A measure of these claims may be estimated by the astigmatism after the eye appears to be healed. As the surgeon may be inclined to inspect the eye too soon after the operation so may the same curiosity tempt him to prescribe lenses before the astigmatism has become final. A second estimation of refraction some months later may show less astigmatism and some improvement in vision. The usual time of ordering glasses is about six weeks after the operation. In my opinion the condition of the eye together with the type of cataract determines *more* than any suture the manner of healing, the degree of astigmatism, and the acuity of vision. The mattress suture fixes the cornea where it falls. If the incision is hesitant and uneven the agglutinated surfaces may heal unevenly. If the incision is on a slant the axi of astigmatism may be at an off axis. When a small conjunctival flap was made no conjunctiva became entangled in the wound. I have had no prolapse of iris following the use of the suture. There has been no folding or waving of the cornea with the suture. And one observes, of course, no eversion of the cornea. If you are in the habit of recording ophthalmometer measurements of astigmatism before and after all your cataract operations. I must record this as a preliminary report on astigmatism. Patients seem to follow in two general classes, one in which they are pleased with the improvement in vision that meets their essential needs, and the other group who

expect their eyes to be returned to youthful vigor and acuity. Most of my cataract patients were in public institutions. The glasses were ordered by the out patient department after they left the hospital. I am informed that many of them do not report for glasses. The records show that plus spheres are usually ordered without much interest being taken by disinterested parties, in the determination of the astigmatism. Many out of town patients get their glasses in their home town. Vision is often improved two lines or more on the chart by careful correction of astigmatism.

The series being reported is of 38 consecutive eyes for which I prescribed glasses. I have not recorded the vision except in the higher degrees of astigmatism. In this series the cylinders prescribed were plus four in three eyes; plus 3.50 in three eyes; plus 3.00 in two eyes; plus 2.25 in one eye; plus 2.00 in four eyes; plus 1.50 in six eyes; plus 1.25 in five eyes; plus one in three eyes; plus 0.75 in two eyes; plus 0.50 in seven eyes; and with no astigmatism present in two eyes. Comparison of the cylinder prescribed and the ophthalmometer reading in a few recent cases shows that in a general way the lens follows the ophthalmometer reading. This is not exact as in one case with a high degree shown by the ophthalmometer, in a badly healing eye with fluid vitreous, the cylinder accepted was much less than the ophthalmometer reading. In one patient there was some irregular astigmatism. The ophthalmoscope showed in this case distinct vitreous opacities. I regret that the ophthalmometer readings were not taken before operation.

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|---|---|---|---|---|
| W. E. J. | +9.00 | +4.00 | Axis 10° | 20/30 |
| U. U. | +8.00 | +4.00 | Axis 180° | 20/65 Fluid Vitreous |
| O. T. H. | +9.00 | +4.00 | Axis 60° | 20/200 Glaucoma |
| E. P. | +6.00 | +3.50 | Axis 10° | 20/50 Myope |
| J. J. | +9.00 | +3.50 | Axis 180° | 20/40 |
| W. A. S. | +9.00 | +3.50 | Axis 75° | 20/30 |
| J. S. | +12.00 | +3.00 | Axis 90° | 20/30 2 Passed R. R. Exam. |
| E. H. | +6.00 | +3.00 | Axis 120° | 20/50 Myope |
| I. F. Y. | +9.00 | +2.25 | Axis 165° | |
| R. W. | +11.00 | +2.00 | Axis 160° | |
| I. F. Y. | +9.00 | +2.00 | Axis 160° | |
| J. S. | +11.00 | +2.00 | Axis 95° | 20/20 1 Passed R. R. Exam. |
| F. K. C. | +9.00 | +2.00 | Axis 45° | |
| B. L. | +10.00 | +1.50 | Axis 120° | |
| C. D. | +10.00 | +1.50 | Axis 90° | |
| L. L. | +11.00 | +1.50 | Axis 90° | |
| E. W. | +11.00 | +1.50 | Axis 100° | |
| W. F. M. | +10.00 | +1.50 | Axis 180° | |
| B. J. K. | +10.00 | +1.50 | Axis 165° | |
| S. D. | +9.00 | +1.25 | Axis 90° | |
| H. M. | +11.00 | +1.25 | Axis 105° | |
| Ed. W. | +11.00 | +1.25 | Axis 110° | |
| R. W. | +10.00 | +1.25 | Axis 165° | |
| F. C. | +12.00 | +1.25 | Axis 90° | |
| J. W. | +11.00 | +1.00 | Axis 110° | |
| F. K. C. | +10.00 | +1.00 | Axis 180° | |
| T. K. | +11.00 | +1.00 | Axis 90° | |
| B. J. K. | +10.00 | +0.75 | Axis 180° | |
| F. C. | +12.00 | +0.75 | Axis 100° | |
| W. H. Z. | +11.00 | +0.50 | Axis 60° | |
| B. B. | +10.00 | +0.50 | Axis 90° | |
| C. N. | +11.00 | +0.50 | Axis 65° | |
| W. R. | +10.00 | +0.50 | Axis 75° | |
| J. W. | +11.00 | +0.50 | Axis 90° | |
| C. W. B. | +9.00 | +0.50 | Axis 75° | |
| W. J. C. | +9.00 | +0.50 | Axis 90° | |
| J. H. | +9.00 | 20/100 | Vitreous Opacities | |
| A. K. | +9.00 | 20/30 | | |

| R FOR ASTIGMATISM | | | | OPHTHALMOMETER |
|---|---|---|---|---|
| U. U. | +4.00 | Axis 180° | 20/65 Fluid Vitreous | 7.00 Diopters at 180° |
| J. S. | +3.00 | Axis 90° | 20/30 2 | 2.50 Diopters at 95° |
| J. S. | +2.00 | Axis 90° | 20/20/1 | 1.25 Diopters at 95° |
| F. C. | +1.25 | Axis 90° | | 1.50 Diopters at 90° |
| L. L. | +1.50 | Axis 90° | | 1.75 Diopters at 90° |
| H. M. | +1.25 | Axis 105° | | 1.00 Diopters at 105° |
| A. K. | No cylinder vision 20/30 | | | 1.00 Diopters at 90° |
| J. H. | No cylinder vision 20/100 Vitreous opacities Irregular Astigmatism | | | |
| E. H. | +3.00 | Axis 120° | | 3.50 Diopters at 120° |

Vision is materially improved by careful astigmatic correction

## CONCLUSIONS

1. The mattress corneal conjunctival suture is easily applied.
2. It is in place before the incision is made.
3. It permits firm closure of the wound.
4. It is accepted by the eye with no harm to the cornea.
5. It is a factor of safety in cataract operations.
6. Its use does not sanction otherwise contraindicated cataract operations.
7. Its effect upon astigmatism is favorable.
8. It meets the usual claims of other sutures for closing the cataract wound.

## DISCUSSION

Dr. Alonzo B. Middleton, Pontiac: The members of this Section, as well as the essayist, are to be congratulated on this excellent presentation. The speaker would like to state that his experience is very limited in cases of this kind. Dr. Higgins sent me the details and some needles, a week ago and a couple of cases were done. The operation is very simple, not as difficult as it appears. My second case looked as if the stitches might be too tight, but they were not. It has not been my custom to measure such cases with the ophthalmometer before operation; but in these cases I did. Neither had a corneal astigmatism. It will be interesting to watch the result.

If a patient can have a cataract operation done and see without a diffusion circle or without having to have a diffusion circle corrected with a lens, it stands to reason that such a patient is fortunate. The operation is simple, the suture is entirely out of the way. I am surprised that the moving picture of such a case makes it appear so difficult. When the suture is taken in the cornea the needle follows Descemet's membrane nicely and it is not going to push through into the

anterior chamber as easily as one might think. I had the eyeball held firmly on each side, but I do not think the essayist does so. Be that as it may, there is no difficulty whatever in properly placing the suture.

Dr. Alexander E. MacDonald, Toronto, Ontario: I want to congratulate Dr. Higgins on this paper. I agree with him in everything he says in the use of a suture. I have used one altogether in the last six years. My method is slightly different from that of Verhoeff of Boston. A tongue of conjunctiva is dissected back and laid over the cornea before making the incision. It gives much less astigmatism. I tie the suture and do a double peripheral iridectomy on either side of the tongue. It leaves a round pupil and I feel safer in irrigating the anterior chamber to know that it is firm.

I was interested in noting the axis of the astigmatism. I have not seen that with the Verhoeff suture which I have used. It is usually 180 degrees, or just off.

Dr. Walter Stevenson, Quincy: I have used this suture a number of times and one of the nice features is that you are able to insert the suture before incising the eye.

Another advantage of the Higgins suture over a conjunctival suture is that it cannot tear out while tying A very small conjunctival flap, which sometimes is unavoidable, will not hold the ordinary conjunctival suture. As a slight modification of Dr. Higgins' suture I tie a knot in the distal end of the thread; in this way one may lift the cornea by a single thread instead of fishing around for both threads, provided, of course, that one desires to do an open operation; more than this, by pulling on the proximal thread one can immediately close the incision without tying, because the knot does not slip through the cornea. In cases of vitreous prolapse this is a very decided advantage, a knot can then be tied leisurely.

Dr. Harry Gradle, Chicago: I agree with Dr. Higgins in a few things he said regarding the use of a suture, and I disagree on others. In the first place I do not care for any suture that goes into the cornea; I do not believe it is sound surgery. In the second place it violates one of the primary dicta in cataract surgery laid down by Von Graefe that "no incision into the anterior chamber should be made through any nonvescular portion of the cornea," nor should there be any incision unless it can be covered with a conjunctival flap. With this type of suture it is impossible to produce a sufficiently large conjunctival flap to provide for the complete coverage of the edges of the corneal wound. With the conjunctival flap, after about three hours there is sufficient adhesion between the flap and the episcleral tissue to hold the wound closed as tight as a suture will hold it. No suture will prevent loss of vitreous. A few years ago I had the pleasure of seeing the past master, Kalt, using the suture in six cases, in three of which he lost vitreous. The use of the suture is advisable when an intracapsular is done, but I do not believe it is necessary in an extracapsular, because we have the posterior diaphragm to hold the vitreous back, and the adhesion of the conjunctival flap is sufficient in these cases to eliminate the necessity of the extra step of the suture. But in intracapsular work where the retaining diaphragm is eliminated in its entirety I believe a suture is necessary. The effect of the suture upon astigmatism has been worked out in large series of cases. If I remember, Elschnig recorded the astigmatism subsequent to 750 intracapsular operations in which he used a suture, and Birch-Hirschfeld recently recorded his findings. It does not seem to make much difference whether or not a suture is used, and I do not believe a suture plays any role in subsequent refraction of the eye.

Dr. O. B. Nugent, Chicago: I am much interested in one phase of the subject, the position of the axis that Dr. Higgins gets. I know in my cases the axis of the cylinders is usually against the rule and most of his cases are with the rule. In a case where astigmatism is present following a cataract extraction the greatest curvature of the cornea is in the horizontal meridian or thereabout. If there is poor healing of the wound or a gape in the wound, the curvature immediately works itself to 180 in the horizontal axis. Therefore, the astigmatism must be against the rule. Dr. Higgins' cases are almost invariably with the rule. Inasmuch as we see in other cataract operations that the axis of the cylinder is against the rule, the suture must have something to do with it.

Dr. Samuel Higgins, Milwaukee (closing): Dr. Gradle is right in that a conjunctival suture does not hold the vitreous. You do not hold it with a loose undermined conjunctival flap. I have pulled the corneal conjunctival threads, with and without tying, and cut escaping vitreous cleaner and closer than with scissors.

There is no trouble at all in removing the thread. It can be taken out five days or two weeks or whenever you choose, after the operation. I use butyn for anesthesia.

Clinically there has been no trouble with healing of the cornea. A corneal incision is used by too many competent ophthalmologists for me to assume that a cut cornea does not heal.

I think Dr. Stevenson's idea of putting one knot in the thread so that you can have an open field is a good one. That is an added advantage of the corneal conjunctival suture. Certainly one can see much better when looking in an open field than when looking through a partially dried cornea.

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## PROBLEMS IN OPHTHALMOLOGY*

LEO L. MAYER, M. D.
CHICAGO

For a meeting of this type it has long been my belief that a panorama of what is being accomplished in our specialty and what is to be desired would be of great value. It would seem that there are four major conditions of interest, namely: detachment of the retina, glaucoma, cataract and trachoma.

*Read before Section on Eye, Ear, Nose & Throat, Illinois State Medical Society. Springfield, May 17, 1932.

*Detachment of the Retina.* Gonin has recently reported 66% cures. He insists that the retinal tear must be found and cauterized. His work has brought forth three lines of thought. First, methods to localize the tear. Colenbrander uses the graphic procedure with a hand perimeter; Cowan and McAndrews a complicated optical method; Majewski the scleral lamp; and more involved procedures by Lindner, Salzman, Safar, Imre, Comberg and others. The variety and number of methods bespeak the difficulties.

Secondly, other procedures for reattaching the retina have been tried. Larsson's use of diathermy, Deutschmann's simple ignipuncture, and Guist's use of the KOH stick.

The third line of investigation has been the consideration of the etiological factors found in these eyes having a retinal detachment. The theories and a review of the subject has been brought forward by Andersons' recent book on "Detachment of the Retina," while Luntz has studied the pathology in animals, and we at Northwestern University have been studying both fluid and tissue changes.

*Glaucoma.* Perhaps the outstanding medical contribution has been the use of various types of glaucosan proposed by Hamburger. In spite of the fact that some of the enthusiasm has waned Rauh reports 30 cases in which operation was delayed by the use of glaucosan, and Green has advocated the use of suprarenin bitratrate, while our own work has suggested the use of higher concentrations of epinephrin. Thiel has proposed gynergen because of its influence on the sympathetic system and Werner has augumented this idea. Palarès because he has experimentally proven an atony of the fibers of the smooth muscles in the vessel walls recommends ergotinin and tartrate of ergotamin. Gradle has recently reviewed those tests used for the early discovery of a glaucomatous condition, such as Seidel's dark room test, the "coffee test" and the effects of digital massage as brought out by Knapp. New operative procedures and modifications of the older methods have been introduced. Herbert and also Holth favor an iris inclusion operation; Slavik and also Gradle prefer the cyclodialysis. However, it would appear that iridectomy for the acute type and Elliott trephine for the chronic are still the most generally used. From the experimental side Zuckermann-Zich believes he has proven the condition due to disturbance of the endothelium of the blood vessels. Rosengren has shown that no relation exists between the depth of the anterior chamber and intra-ocular tension. Studies on the intra-ocular fluids by Salit and O'Brien and also Duke-Elder's important contributions, together with the work of Magitot have enhanced our knowledge of the physiology, physics and chemistry of glaucoma.

*Cataract.* Since Barraquer's report the pendulum of operative methods has swung to the intracapsular type. The suction apparatus has been used with success by Harrison, Wolfe and Nugent. However, the use of capsule forceps seems to be reported oftener. Knapp obtained good results in his last third hundred cases. Arruga prefers the Stanculeanu-Torok method as also does Varshavski. Van Lint uses a temporal incision and then facoerisis. Additions to our knowledge of the lens have been made by the use of the slit lamp in Vogt's hands especially. Salit has studied the chemistry of the lens while Friedenwald and also Lebensohn in our laboratories have added to our knowledge of lens permeability. Kirby in investigating the calcium metabolism used parathormone without result. Andersen has investigated the sugar metabolism.

*Trachoma.* While this condition may be a rarity to some of us, those in the southern and western portion of the state of Illinois are very familiar with it. Its importance is emphasized by the fact that a periodical, "Revue International du Trachome," deals exclusively with this subject. Of outstanding nature is Nouguchi's report on the discovery of the causative organism. Complete and satisfactory substantiation of this contribution has not been acknowledged. Gifford and Kendall working in our laboratories have been unable to find a vitamin A deficiency. Also at Northwestern, Gifford and Lazar have shown definitely that the inclusion bodies thought to be of so much importance by Lindner are due rather to an irritative phenomenon. Various treatments have been recommended which because of their number point to the fact that an ideal cure is not as yet forthcoming. Carbon-dioxide snow has been used by Szorgen, sodium chloride massage by Martinez; Pellathy and Schneider felt that sodium bicarbonate was indicated due to the acid displacement of the H-ion in trachoma. Medvediev has advocated autohemother-

apy for pannus, Coppez uses surgical diathermy, Stastnik injects thio-sulphate and sulphate of copper intravenously. Operatively the Denig graft of mucous membrane from the mouth has recently been shown not to be immune by Friedman, and Karbowski finds peritomy of greater value. The value of tarsectomy has been shown by Beigelman. Experimentally Tricoire has evolved an intradermal test for trachoma which is positive in about 80% of the cases.

Of the minor problems many may be touched upon more systematically on an anatomical basis.

*Lids.* Mayou has obtained excellent results in the treatment of blepharitis with vaccines, while Gutmann recommends radiation. Cardell advocates ultra-violet light in combination with vitamin A for hordeola and other superficial lesions. The use of Brilliant green for the cure of chronic persistent blepharitis is brought forth by Cerkasov. Injection of 80% alcohol for spastic entropion is Dudinoff's method. As an aid in intraocular operations Feingold does canthotomy while O'Brien paralyzes the branch of the facial nerve to the orbicularis muscle. Terson accomplishes akinesia by injecting 2% novocain from the conjunctival surface through the lid and then subconjunctivally. Hollis advocates resection of the orbicularis in paralytic ectropion.

*Cornea, Conjunctiva and Sclera.* Key reports a method for transplanting the whole cornea. Good results in tattooing of the cornea with gold and platinum chloride have been obtained by Sourdakoff and also Pischel. Lazar, in our laboratory, in a study of clinically diagnosed cases of ophthalmia neonatorum has demonstrated other organisms as the causative factor. Shieck believes the phlyctenule is an immunity reaction. Strebel has analyzed the scleral components as a means of studying changes due to malignant myopia. Manoli has studied vernal conjunctivitis and believes that a vagotonia due to a decrease in epinephrin output is the basis for the condition. He recommends adrenalin and calcium in the treatment. Peritomy is recommended by Szokolik for the prevention of corneal complication in gonorrhea. In a thorough and painstaking work Nicolich has investigated ocular antiseptics on a pharmadynamic basis. He shows that their action depends upon plasmolysis or the coagulation of albuminoids, and emphasizes that these facts must be taken into consideration in our choice of antiseptics. For preserving the sterility of eye drops Miklos uses a 0.05% propylester of paraoxybenzoic acid.

*Extra-Ocular Muscles.* With the advent of spinal anesthesia the occurrence of ocular muscle palsies have been reported by Fawcett, Levin and others. Castraveigo has clarified Marquez' method of determining the muscle paralyzed in diplopic conditions. A new muscle shortening operation has been devised by O'Connor while Berens has advocated measured tenotomy. Gifford has described an operation for the correction of abducens paralysis. Salvati has advocated the use of alcohol injections for the treatment of strabismus, but Dudinov after trying the method feels that the effects are transient due rather to cicatrix formation than to motor nerve fiber paralysis. A new stimulus has been added by the English school with results obtained in orthoptic treatment of non-paralytic squint, especially brought forward by Maddox.

*Uvea and Retina.* Wibaut reports good results in pigmentary degeneration of the retina with the injection of menphormone (an ovarian hormone). The question of uveitis has been thoroughly discussed at the last meeting of the Association for Research in Ophthalmology, which papers have appeared in the *American Journal of Ophthalmology.* That this subject is vital is shown by its choice for discussion at the International Congress in Spain in 1933. Methods of treating embolism of the central artery with atropine has been used by Kotilianskaya, while Imre uses amyl nitrate and Schmidt-Rimpler advocates massage of the vessel. In order to be of aid to our obstetrical colleague Maries has outlined the changes in the retina during pregnancy which call for its interruption.

Among the more general topics for consideration are a multitude of diversified subjects. Guist feels that he is able to diagnose more accurately general vessel changes by changes in the retinal vessels. The relation of postural tone and the eye has been enhanced by the work of Metzger, and we have added to this subject in a demonstration for the Central Neuro-Psychiatric Association last year. Chronaxie of the optic nerve has been investigated by Adrian, Achelis and Merkulow and

Fischer and Hofe. Some light has been shed by Nafziger on exophthalmos of Graves' disease. Judd has described the ocular findings in the more or less newly discovered condition known as tularemia or "rabbit's disease." Bothman believes that thyroid substance is indicated in progressive myopia, while Wiener still advocates epinephrin instillations and our work at Michael Reese Hospital would tend to show that higher concentrations of epinephrin are even more beneficial. A means of clearing the argyrosis of the conjunctiva and sclera is contributed by Weymann. Kiang has found ointments to be more efficacious both in time and extent of their action for miotic or mydriatic effect. Cremer found that calcium by mouth shortens the course and lessens the chance of recurrence in phlyctenular disease.

From this rapid and superficial résumé you may gain some idea as to what is being accomplished in ophthalmology. If I have been able to convey to you some work with which you were not conversant, or if I have been able to stimulate any new ideas, I shall feel that this discourse was not in vain. By reviewing some of the work reported, and bringing forth ideas on other work to be done I hope I have shown you a few of the many problems in ophthalmology.

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## DISCUSSION

Dr. Walter Stevenson, Quincy: Dr. Mayer's paper is such a complete story of the progress of ophthalmology that I do not see how I can either add to or detract from it. He has not overlooked very much that is of interest. Certainly a paper of this sort is difficult to discuss. However, it occurs to me that it might be of interest to give one's personal practical experience along some of the lines brought out in the paper.

My experience with retinal detachment is limited to a small number of cases such as one would see in an ordinary private practice. Results in these cases have been extremely disappointing. One case in which I felt that a tear in the retina was located was cauterized without cure. So far as personal experiences are concerned, I have never seen a case of retinal detachment that was cured. The reported results of Gonin suggest a more optimistic outlook. Detachment is not common; the difficulty in locating the tear and the highly technical treatment suggest that perhaps these cases should be referred to one who sees many of them. A recently reported experimental study by the essayist would indicate that the retinal tear or hole is not the entire factor in maintaining detached retina. I want to congratulate Dr. Mayer on his experimental work.

Glaucosan has, I am sure, saved vision in several acute inflammatory glaucomatous cases. I have not found it so useful in chronic simple cases. Laevo-glaucosan has been very useful in bursting recent adhesions of acute iritis. I have used glaucosan preliminary to external eye operations and also preliminary to trephining for glaucoma as a hemostatic. This makes the field practically bloodless. I have the feeling that iridectomy is the best operation in cases of acute congestive glaucoma, and in these it has served me well, provided the case was seen in the first or even second attack. So many operations have been devised for chronic simple glaucoma that one is tempted to believe no one of them is satisfactory. The Elliot trephine operation has been my choice in these cases.

There can be no doubt that cataract extraction in capsule is theoretically the ideal operation. I have discarded the so-called Smith-Indian operation—it is too dangerous in my hands. Extraction in capsule by forceps has given me too many torn capsules to continue its use. This of course may be due to poor technique. I have used the Barraquer type of operation for the past few years, and in selected cases it is ideal. In fully mature cataract I believe the capsulotomy operation gives quite as good results. Intracapsular extraction is contraindicated in patients under 50 years of age. The O'Brien method of injecting the seventh nerve for akinesia certainly fulfills all requirements; it does not cause edema of the lids and requires but one needle puncture. Retrobulbar injection prior to operation is apparently an additional safeguard in cataract extraction. I should like to call to your attention the excellent corneal conjunctival suture devised by Dr. S. G. Higgins of Milwaukee.

Injection of alcohol for spastic entropion has given excellent results in one case.

Spinal anesthesia is now being used almost routinely in our hospitals for operations below the diaphragm. We have not seen ocular complications following the procedure. The technique of this method of anesthesia is now so improved and standardized that a report of bad results should always give the details of technique and the type of anesthetic used. Novocain is considered the safest drug. I believe bad results from the standpoint of ocular muscular paralysis have been due to the use of stovain.

Adrenalin instillations in cases of progressive myopia, and cases of incipient myopia in children is distinctly indicated. I have used it routinely in cases presenting symptoms of progression and feel that the disease has been arrested.

Calcium and vitamin deficiencies apparently are underlying etiological factors in many cases of blepharitis, conjunctivitis, and phlyctenulosis. In children especially the addition of viosterol is beneficial. Indications for the administration of calcium and parathyroid extract should be considered.

Dr. Samuel Higgins, Milwaukee: Dr. Mayer referred to argyrosis. I had one patient, a woman, who had a pronounced stain of the lower lid. I gave her urotropin which decreased the discoloration markedly. Urotropin internally also absorbs the argyrosis of the sclera. The medicine should be taken several months.

While it may not be used as much as the literature of the manufacturers would indicate, laevo-glaucosan has an active field in glaucoma. I do not believe it should be neglected or discarded.

Dr. Leo L. Mayer, Chicago (closing): I want particularly to thank Dr. Stevenson for his interesting type of discussion. Papers such as this, which give a résumé of what has been done in the field of ophthalmology, are difficult to discuss, and I appreciate very much what he has said.

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# SOME LEGAL ASPECTS OF PUBLIC HEALTH AND MEDICINE*

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The limited time allowed me makes it necessary that this paper be largely selective. There is a mass of matter in our Statutes and the rules and regulations established by the State Board of Health, which is very interesting

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indeed, but the enumeration of which would carry this paper far beyond the limits of time at my disposal.

I cannot even attempt to enumerate all the matters over which the Boards of Health, State and local take jurisdiction. I can safely make this statement, however, that an examination of the Statutes of Illinois and the rules and regulations established by the State Board of Health will disclose the fact that Illinois is far in the forefront in the matter of the preservation of the public health.

In my judgment, there is still room for considerable advance. Universal compulsory vaccination for smallpox should be made a law. There are matters still in the controversial stage, such as the Schick test and the Dick test, which I believe in time will be proven so efficacious that they also may be covered by legislation.

The word health, as referred to the condition of the body, means freedom from disease, sickness or pain; that condition of our living organism and its various parts and functions which conduces to assist and prolong life.

It is a well recognized principle that the protection of the public health is one of the first duties of Government.

This power may be exercised by the Federal Government, by the State, by municipalities, or by other local subdivisions of the state, through officials and official boards to whom the power may have been properly delegated. This power must be exercised reasonably. It cannot be so used as to deprive citizens of the exercise or enjoyment of their lawful rights, if done in a manner not injurious or dangerous to others. However, when the object of an enactment is to promote the public health, there is no invasion of constitutional rights even if the enforcement of the law interferes to some extent with liberty or property.

Statutes enacted for the purpose of preserving the public health are subject to the final decisions of the courts as to whether they are reasonable, but the universal rule is that they shall be liberally construed to carry out such purpose. Every intendment is to be allowed in favor of their validity.

If the question is at all close, the Courts will take the opinion of the Legislature as set forth in the law.

Boards of Health are regarded as administrative bodies. They are governmental agencies, endowed by law with distinct legal rights. They may be vested by the legislature with the power of making rules and regulations for the protection of the public health and when such rules and regulations are duly adopted by virtue of legislative authority, they have the force and effect of law. It becomes the duty of all persons affected thereby to obey the same and for a violation of these rules or regulations, the offender may be subjected to a criminal prosecution.

Incidentally I might mention some early legislation in this country. In the 18th Century there were epidemics of yellow fever, in New York, Philadelphia, Charleston, Baltimore and other seaports. When the great epidemic was raging in Philadelphia in 1793, Virginia resorted to strict quarantine laws as a safeguard against yellow fever. Smallpox periodically assumed epidemic proportions. In Virginia, as well as in Europe and other places, there was at first great opposition to inoculation and vaccination against smallpox. An epidemic in Williamsburg in 1768 was attributed to inoculation. An Act was passed in 1770 to penalize anyone wilfully importing variolous matter with the intention of inoculating. Seven years later this Act was amended to permit inoculation if the consent of the housekeepers within the radius of two miles was first obtained.

It is interesting to recall a matter which gave the Revolutionary Army trouble. Congress in 1778, in an effort to diminish venereal diseases, issued an order to the effect that $10.00 should be paid by every officer and $4.00 by every soldier who was sent to any hospital to be cured of venereal disease and those sums were to be deducted from their pay.

Malaria was particularly troublesome in the south. Congress, in 1776, ordered that 300 lbs. of Peruvian Bark be sent to the Southern Department for the use of troops.

The term "Practicing Medicine" is not limited to the use of drugs or substances supposed to possess curative or remedial properties but includes the treatment of disease for the purpose of a cure, whether such treatment involves the use of drugs or not and, in com-

mon acceptation, anyone whose occupation is the treatment of diseases for the purpose of curing them is a "physician." The People v. Siman, 278 Ill. 256.

Section 4 of the Medical Practice Act, entitled: "An Act To Revise the Law In Relation To The Practice and Treatment of Human Ailment For the Better Protection of The Public Health and to Prescribe Penalties for the Violation Thereof," notes two branches:

(a) The practice of medicine in all of its branches.

(b) The treatment of human ailments without the use of drugs or medicines and without operative surgery.

The first branch refers to the general practitioner and needs no elucidation.

As to the second branch, the examination of applicants who seek to practice any system or methods of treating human ailments without the use of drugs or medicines or without operative surgery shall be the same as required of general practitioners excepting materia medica, therapeutics, surgery, obstetrics and theory and practice. If the applicant is a graduate of an institution in which obstetrics was taught, he may be examined in obstetrics and, if found satisfactory, allowed to practice obstetrics. Under this branch come osteopathy, chiropractors, neuropaths and a large number of others. (Examination of applicants who seek to practice midwifery are left largely to the discretion of the Department.)

Physicians as defined in the Siman case, such as osteopaths, are authorized to treat human ailments without the use of medicine and without performing surgical operations and under such authority they may treat cases of pneumonia, gastritis, rheumatism, paralysis and other diseases. (The Siman case page 259.)

It is interesting to note the provisions of Sec. 21, of the Medical Practice Act reading as follows: "Nothing in this Act shall be construed as prohibiting any person from using any antiseptic prescribed by the Department of Public Health of the State for the prevention of the spread of communicable diseases nor from using antidotes, or rendering any other service in case of emergency, if without compensation."

The Act does not apply to dentists, pharmacists, optometrists, etc., who are treated in other acts.

No person shall make representation that he can permanently cure a manifestly incurable condition of sickness, disease or injury.

Apparently, there is no prohibition against masseurs, magnetic healers, Christian Science healers and the like so long as those who follow these practices do not advertise their business as that of a doctor or physician. (The People v. Gordon 194 Ill. 560.)

The Legislature has recognized the fact that there is efficacy in the practice of systems or methods of treating human ailments without the use of drugs or medicines and without operative surgery, when scientifically done by persons who can comply with the qualifications laid down by the law.

Without going into the requirements, I will state that in my opinion the provisions of the law are fair and fairly administered by the Department. In a recent report issued by a committee, of which Ray L. Wilbur, Secretary of the Interior and a Physician, is chairman, entitled "The Healing Cults," it is stated that there are about seventy cults of miscellaneous drugless healers practicing medicine irregularly and illegally in the United States. However, whether one's individual opinion is favorable or unfavorable to the drugless healers, the law recognizes them as legitimate and, if they comply with the Statute, they are entitled to pursue their occupation.

The report above referred to states that out of the total number of one of these cults, nearly one-fourth practice without a license, that is, illegally.

The Department has representatives throughout the State who run down men and women so practicing without licenses and bring them before the proper court which imposes fines. This is sometimes referred to as persecution, but, as a matter of fact, it is clearly for the purpose of protecting the public health.

An interesting question arises where a member of one of these cults is called to treat a case such as diphtheria and fails to diagnose it and the patient dies: is the practitioner criminally liable? In reason he should be so held and I think the Courts will uphold a conviction.

In People v. Johnson, 265 Ill. App. 179, it is held as follows:

"Practice of medicine without a license, contrary to Cahill's St. ch. 91, Par. 25, is sufficiently shown to support a conviction where the evidence shows that the defendant held himself out as a person engaged in the treatment of human ailments, maintaining an office and erecting a sign with the abbreviation 'Dr.' prefixed to his name thereon, that he appeared in the telephone directory as a 'Naprapath,' that he advertised in radio addresses that he could cure any disease except leprosy and cancer, calling himself "Doctor," that he also advertised in newspapers, and that at his office he treated persons for certain ailments by manipulating their bodies with his hands, receiving compensation for his services.

"Under the Medical Practice Act providing for the punishment by fine or imprisonment in the county jail, or both, of persons committing any of the offenses enumerated in the act, a defendant found guilty of practicing medicine without a license may be sentenced to the State Farm at Vandalia, since our statutes further provide that the court may sentence a prisoner to jail or to the State Farm if found guilty of a misdemeanor.

"As a general rule, the religious doctrine or belief of a person cannot be recognized or accepted as a justification or excuse for committing an act which is a criminal offense against the law of the land.

"The law has imposed a positive and absolute duty on parents whatever their conscientious or religious opinions may be, to provide medical aid for their infant children in their custody. The facts show that the prisoner thought it was irreligious to call in medical aid but that is no excuse for not obeying the law. Corpus Juris, Vol. 16, page 93."

It might be added that if an adult is satisfied to get along without medicine or with any particular treatment by any cult, there is no law against this, any more than there is a law against suicide.

*State Department of Public Health.* For administrative purposes, the State Department of Public Health is organized into ten divisions, which operate to provide a well rounded Public Health service in the State.

The Central Division is the administrative unit.

The Division of communicable diseases is the detective bureau. Its business is to keep informed about the activity of germs in the state, to seek out their hiding places, prevent them from travelling and to build up barriers against them. The division is headed by a physician or an epidemiologist, as he is called. Under him are a dozen other physicians throughout the state and 2700 local health officers, who send in daily reports of cases of communicable diseases.

The division of vital statistics keeps record of all births, deaths, etc.

The division of laboratories makes tests of blood, sputum, feces, water, dog's heads and other matter to determine whether or not disease germs are present. The services of the laboratories are free to citizens of Illinois. Tests are made for typhoid, diphtheria, tuberculosis, malaria, syphilis, gonorrhea, rabies, undulant fever, tularemia, Vincent's angina and several other diseases.

The Division of Public Health Instruction spends large sums annually to keep the people informed about current health conditions, sound scientific control and preventive measures, by means of the press, the movie, the platform and exhibit halls.

The Division of Sanitary Engineering investigates municipal water, sewage, disposal systems, inspects milk plant, abates nuisances and participates in mosquito eradication projects.

The division of child hygiene and public health nursing is largely a teaching organization.

The division of venereal diseases undertakes to improve health by preventing the spread of these diseases. It requires reports from all physicians and the maintenance of free clinics. It also provides lectures, literature and motion picture films.

Illinois has a Statute which enables counties or cities to segregate and treat persons suffering from this disease.

The division of tuberculosis undertakes to enforce rules and regulations governing its control.

The division of lodging house inspection is confined to Chicago. Its purpose is to pre-

vent overcrowding, to see that sanitary standards prevail, investigates ventilation, water supplies, sewage disposal and cleanliness.

Under the Civil Administrative Code, the Department of Public Health has practically unlimited powers over every possible matter which in any way affects the public health.

*Local Boards of Health.* Paragraph 76 of Article V of the Act to provide for the incorporation of cities and villages, gives power to the City Council, "To appoint a board of health and prescribe its powers and duties."

Under a separate Act found in Chapter 34, pertaining to Counties, the Supervisor, Assessor and Town Clerk are constituted a Board of Health, whose powers may not be exercised within the limits of a City or Village. These town boards are empowered by Statute to do all acts and make all regulations necessary or expedient for the promotion of health or suppression of disease, appoint a health officer, provide gratuitious vaccination, disinfection, etc.

The State Board of Health, having general supervision of the interests of the health and lives of the People of the State, has supreme authority in matters of quarantine.

It is the duty of all local Boards of Health, health authorities and officers, police officers, sheriffs, constables and all other officers and employees of the State in any county, village, city or township thereof, to enforce the rules and regulations that may be adopted by the State Board of Health.

In People v. Robertson, 302 Ill. 422, it is held:

1. That the preservation of public health is a part of the police power of the state;

2. The exercise of police power to preserve public health rests with the Legislature and the courts have nothing to do with the wisdom or expediency of the measures adopted and will not interfere except where the regulations are arbitrary, oppressive and unreasonable.

3. The State Board has authority to designate such diseases as are contagious and infectious.

4. It has power to isolate persons who are throwing off disease germs and thereby endangering the public health.

5. As quarantine is not a cure but is a preventive, the person quarantined need not be actually sick and it is not necessary for the health authorities to wait until he has actually caused others to become sick by contact with him before placing him under quarantine.

6. A person may be quarantined who discharges germs of typhoid fever whether or not the person is actually sick or has ever suffered from the disease, provided a proper examination discloses that such person is a carrier of typhoid bacilli.

7. The Legislature has authority to confer upon local boards of health the exercise of powers to prescribe rules and impose penalties concerning health if not in conflict with the rules of the Department of Public Health.

The Supreme Court held that the power to quarantine must be exercised by the *board* of health and cannot be delegated to a health commissioner.

This rule would without doubt apply to Town Boards of Health. The Robertson decision was rendered in a case where a typhoid carrier was quarantined. The quarantine regulations prescribed that the carrier should remain in her home and forbade her to prepare food for any one excepting her husband; she should let none come into her home as roomers or otherwise unless they had been immunized from typhoid fever.

It is interesting to know that there are in Illinois about 100 individuals who are chronic carriers of typhoid fever, known to the health officials of the State, all of whom are under agreement not to handle foods or do work like dishwashing. The State Department of Health keeps informed of their whereabouts and a representative of the Board visits them periodically.

*Vaccination of School Children.* In Hagler v. Larner, 284 Ill. 547, this question is discussed.

The Board of Health of Granite City passed a resolution that all children be excluded from the public schools for a period of two weeks unless recently vaccinated or unless they produced a certificate that they had been successfully vaccinated within the past five years or had had smallpox. The Court upheld the rule.

In many countries compulsory vaccination has been the settled policy of the State and our own country has adopted it as one of the preliminary requisites to military service.

Vaccination is now recognized as the only safe prevention of the spread of smallpox and while parents have the right to resist compulsory vaccination of their children except in cases of necessity, yet they have no right to insist upon their children continuing in school when smallpox is epidemic in the community and the school board passes such a rule, as appears in this case.

Illinois has a Food Standard Commission for the purpose of determining and adopting standards of quality, purity or strength for food products, with power to examine raw materials used in the manufacture of food products and to determine whether they are fit. They may examine all premises, carriages or cars where food is manufactured, transported, stored or served to patrons.

Their powers extend to the examination of all manufactured articles of food or drink.

The law provides licenses in certain cases and penalties for violation of the law.

It is stated in the People v. Price, 257 Ill. 587, that one of the objects of the Pure Food Law is to protect the Public Health by prohibiting dealers from selling food to which has been added for the purpose of preserving it, ingredients injurious to health, or from selling any compound as a preservative which contains any such ingredients. There is in the Pure Food Act a prohibition against the use of boric acid. The conviction of a party using boric acid in a canning compound was sustained. The defendant contended that boric acid is not unwholesome and injurious and quoted from various scientific authorities. Proof was introduced to the effect that boric acid was injurious to the human system. The Court held that the Legislative declaration that it was unwholesome must be accepted by the Courts.

Under a general power to preserve the public health and to make regulations for that purpose, health authorities may prevent the assembling of people and may close public places during the existence of a contagious disease in the community. This rule has been applied to the closing of public schools and moving picture theaters and the prohibiting of carnivals, chautauquas, circuses and fairs. Such orders or regulations are not invalid by reason of the fact that they may have the effect of preventing the performance of contracts. (29 C. J. 252.)

Illinois has an act for the sanitary control of swimming pools.

Another act covers the sale of bedding.

Another act provides for mosquito abatement districts.

We have on our Statute books the Illinois Nursing Act, the Pharmacy Act, the Dental Surgery Act, the Veterinary Medical and Surgery Act, an act regulating the practice of Chiropody and the Narcotic Drug Control Law.

*Tuberculosis in Cattle.* It has taken a long time to secure proper Legislation in regard to Bovine Tubercular eradication. The present act became effective July 1, 1929.

Section 2 of the Act of 1929 provides in part as follows: All owners of dairy or breeding cattle within the State of Illinois shall submit their cattle for a tuberculin test upon the request of the Department of Agriculture and shall provide necessary facilities for making tests and lend such assistance as may be required by the Department. The direct expense of making such tests shall be paid by the Department.

Section 4 provides that if upon making any tests it shall appear that any such cattle are affected with tuberculosis, it shall be the duty of the Department of Agriculture to cause the destruction thereof, but no such cattle shall be destroyed without the consent of the owner. All cattle found tubercular shall be branded on the left jaw with the letter "T". The animals shall be quarantined. If the owner consents to the destruction, appraisal shall be made.

It is unlawful to sell or purchase any cattle known to have reacted to the tuberculin test until they have recovered.

The reluctance of the owner of cattle to have them tested is based largely on fear. He thinks possibly the cattle will be found infected, which would result in loss. The other source of fear is that a perfectly healthy cow may become infected and it is very difficult to persuade him to the contrary.

Tuberculin is essentially the clear, sterilized fluid, derived from broth cultures of the tuberculosis bacillus. It is entirely free of tuberculae bacilli and of harmful bacteria of all

kinds. It never does a healthy cow the slightest harm. It does not even hurt a tubercular animal but merely shows that she has the disease and ought to be slaughtered in the interest of community health.

There have been some law suits against the official bodies concerned by disbelievers in the efficacy of tuberculin testing, but these have all been decided in favor of the Department of Agriculture.

One of the interesting statutes of Illinois refers to the practice of beauty culture. This is considered lawful if done for cosmetic or beautifying purposes and not for the treatment of disease or of muscular or nervous disorder. These beauty culturists must be licensed.

The Legislature has also seen fit to regulate the business, art and avocation of a barber. This is under the Department of Registration and Education as is also that of beauty culture.

In Wiedeman v. Keller 171 Ill. 93, the question arose whether a retail dealer in meats and provisions for consumption is to be regarded as a warrantor, that the goods are sound, wholesome and free from all defects that may injure the health of the purchaser.

The Court holds: "That public safety demands that there should be an implied warranty on the part of the vendor that the articles sold are sound and fit for the use for which it was purchased and that the lack of knowledge by the retailer of the impure or tainted condition of such goods is no defense to an action for damages."

An interesting decision was recently rendered by the United States Supreme Court in the case of New State Ice Company v. Ernest A. Liebmann.

The Court held that the business of manufacturing, selling and distributing ice may be subjected to appropriate regulations in the interest of Public Health.

In the course of the opinion the Court states: "The business of manufacturing, selling or distributing ice, like that of the grocer, the dairyman, the butcher or the baker, may be subject to appropriate regulations in the interest of public health."

While the decision was really upon another question, the Court plainly indicated what their ruling would be in any case where there was a question as to appropriate regulations in the interest of the public health.

Some statutes contain provisions which hardly seem necessary for the conservation of health. For illustration: An Illinois Statute provides that in every room in any lodging house, boarding house, tavern, inn, or hotel containing more than one bed, the beds shall be so arranged as to leave a passage way of not less than two feet horizontally on all sides of each bed and they shall be arranged that under each of them the air shall freely circulate. One western State passed a law providing for the length of sheets.

There are a number of provisions in the Statutes concerning health whose enforcement does not appear to be in the hands of the health department. For illustration: The state factory inspectors seem to have jurisdiction over the health of employees in all industries which they inspect. Again, mine inspectors look after sanitary conditions in the mine.

While the Statute on Ophthalmia Neonatorum places the subject under the jurisdiction of the State Board of Health, the Act is found in the Criminal Code. Any diseased condition of the eye of an infant in which there is any inflammation, swelling or redness in either one or both eyes apart from the natural discharge of the eye within two weeks after birth is known as ophthalmia neontorum. It is the duty of the physician, surgeon, obstetrician, midwife, nurse or hospital or indeed any person assisting at birth, observing this condition to immediately report to the health authorities, who report to the State Board of Health, which in turn provides for the gratituitous distribution of a scientific prophylactic, together with proper directions for the use of the same. Violation of the Act subjects the guilty person to a fine of not less than $10.00 nor more than $100.00.

*Sterilization.* Somewhat akin to the matter of public health is sterilization of the feeble-minded. This law is in effect in some States. The Supreme Court of the United States in a Virginia case has held that:

"The state may provide for the sterilization of a feeble-minded inmate of a state institution who is the daughter of a feeble-minded mother and the mother of an illegitimate feeble-minded child, where it is found that she is the probable

potential parent of socially inadequate offspring likely to be afflicted, and that she may be sterilized without detriment to her general health, and her welfare and that of society will be promoted by her sterilization."

The Supreme Court of the United States in a decision rendered at the October Term, 1924, discusses the liability of a physician under the Harrison Narcotic Law. This Law is essentially a revenue measure but, as a matter of fact, its operation is almost entirely directed to regulate the giving of narcotics by physicians to patients. Every prosecution of physicians is based upon the question whether the physician is furnishing narcotics in improper quantities to regular addicts or not. The United States Supreme Court held in the case of Linder v. U. S., decided at the October Term, 1924, that a physician cannot be prosecuted for delivery to an addict for self administration, four small tablets of morphine or cocaine for relief of conditions incident to the addiction. If the physician does from his own stock or by means of prescription enable one known to him to be an addict, to obtain from a pharmacist enormous quantities of the drug, the physician may be prosecuted.

Illinois has an Act regulating and limiting the hours of employment of females in certain industries, places of amusement, etc., to ten hours per day. The title to the Act recites that it is: "In order to safeguard the health of such employees."

The United States Supreme Court has held that the liberty of contract is not unconstitutionally impaired by such a Statute.

The case in which the question arose was a New York Statute, forbidding the employment of women in restaurants between the hours of ten at night and six in the morning. In this case the Court stated that it would not review the determination by the Legislature that night work in restaurants by women is so detrimental to their health and welfare as to justify its prohibition.

It would be interesting to detail efforts made to prohibit child labor in some states.

Though Acts of Congress have been passed prohibiting the passage in Interstate Commerce of goods manufactured by child labor, the Courts have held, and I think properly, that such matters are within the sole jurisdiction of the states.

*Public Health Districts.* The General Assembly in 1917 passed an Act to authorize the organization of Public Health Districts and for the establishment and maintenance of a health department for the same. This Act provides that any town or two or more adjacent towns in counties under township organization, any road district or two or more road districts in counties not under township organization or a combination of the two may be organized into a public health district. Upon proper petition the question is submitted to a vote of the people. If favorable, a public health district is organized. In counties under township organization the board consists of a supervisor, assessor and town clerk in the case of a single town and in the case of two or more adjacent towns, the supervisors of such towns and the chairman of the county board shall constitute the board. In certain other cases other officers are provided. This board has power to levy taxes, appoint a public health officer, appoint nurses, chemists, experts, clerks and assistants, maintain laboratory and acquire real estate and personal property. The health officer has large powers.

For some unaccountable reason this splendid Statute has not resulted in the formation of many districts in the state.

A type of the successful working of a district of this kind may be found in the Hygienic Institute for LaSalle, Peru, and Oglesby, founded by F. W. Matthiessen, a public spirited and philanthropic citizen of LaSalle, Illinois, in 1913 and endowed by him. (The law in question was formulated and submitted to the legislature under direction of Mr. Matthiessen in 1917.) It was legally chartered for the purpose of protecting the health of the people of LaSalle and Peru Townships and for carrying on scientific research, particularly in the field of preventive medicine.

The present director is Arlington Ailes, M.D., C.P.H.

A summary of the activities of the Institute will show what could be accomplished and was intended to be accomplished by a public health district. The activities of the Institute may be summarized as follows: Physical examination of all school children; dental clinics,

maternity and infant welfare visits; pre-school hygiene; bedside nursing; maintenance of laboratory providing for diagnosis of typhoid, tuberculosis, diphtheria, gonorrhea, milk and water, and foods.

Particular attention is paid to communicable diseases, such as diphtheria, typhoid fever, tuberculosis, smallpox, scarlet fever, measles, whooping cough, mumps, chickenpox, influenza, epidemic meningitis. The Institute operates a venereal disease clinic. It has a department of vital statistics covering births and deaths, which gives also the ten leading causes of death, maternal mortality, etc.

The Institute also maintains a medical library for the benefit of the physicians in the Cities of Peru, LaSalle and Oglesby. It will be seen from the above what might be accomplished by Public Health Institutes organized under the Statute.

## DISCUSSION

Dr. Crooks: I would like Dr. Ailes to give you a little account of the activities of the Hygienic Institute.

Dr. Arlington Ailes, LaSalle: I won't impose myself upon you by reciting the activities of the Institute. I haven't prepared anything. To talk about it would require too long a time and we don't have the time. Having just come from delivering a radio talk, I am at least temporarily radio-minded, but I do want to say that you have just been listening to Mr. Griggs, of Ottawa, who is a real public health authority and has been for years. He was the advisor to Mr. F. W. Matthiessen, who was a citizen of our community and who endowed this Hygienic Institute for LaSalle, Peru and Oglesby, and Mr. Griggs was his legal adviser and has been the legal adviser of this Institute ever since. When we get into trouble, he is our friend in need, and he even takes the Journal, A. M. A. and reads it regularly, so that he is of a sort of quasi M.D. You saw how fluent he is in his knowledge of public health. And he was the man who drafted this law which allowed districts to organize towns and cities. I believe Quincy is the only one in the State that has taken advantage of that law.

Dr. McShane: Berwyn and Quincy.

Dr. Ailes: I was very fortunate in getting Mr. Griggs to compile this paper, and he told me the other day he was getting lots of fun out of doing it. So we have him here. He is a pinch hitter, too, in our district. He gives radio talks, Rotary talks and other civic talks on short notice. Mr. Griggs has been interested in Public Health for years, and is peculiarly fitted to write this paper.

Dr. A. J. Roberts, Ottawa: In behalf of the profession that I represent, I want to thank Mr. Griggs for this able paper on public health measures. I want to say that we have had our various scraps in Ottawa, and doubtless you all have, with the various cults and paths. They have tried to undermine our hospital. They have one foot in, I imagine through the connivance of attorneys and, if we are not careful, they are apt to get the whole body in, and it will destroy our nurses school of which we are very proud. We are just about to receive recognition as an accredited hospital in the American Hospital Association, unless these people are able to get in, because we are a municipally owned hospital, partially supported by tax measures. Mr. Griggs has always been a friend of the profession. I think it is true generally that the regular profession, whether it be medicine or veterinary, dental or law, stands together in our fight in these various cases that come up.

When we see these traveling dentists come through and undermine our regular dental profession, it naturally arouses the ire of the regular profession of medicine. When we find that these various cults are coming in and undermining the regular profession, naturally it arouses the antagonism of the profession. We have two cases in the courts right now where some of our allied professions, if you want to call them such, are treating people with drugs and the use of the knife and hypodermic needle, so far as they are able to do, even injecting varicose veins, and we have been informed by the health authorities that they have no license to do this sort of practice.

Mr. Griggs has always been with us in these scraps and we have appreciated his help.

He mentioned the matter of the sterilization of the mentally defective. I believe we should carry it still further. Not only every mentally defective should be sterilized but every criminal also. We are making efforts to improve the class of live stock. We are spending a lot of money in getting high-class horses and cattle but we don't pay much attention to the human race and until we do we are going to have an increased number of defectives. Our institutions in the State now are way over-crowded. Go down to Dixon or to Lincoln and we find they haven't room enough to take those that we want to accept from our various counties. Why should we increase this number instead of limiting the number?

I would like to say one word in behalf of the Hygienic Institute that he spoke of. It is really a model that every county in the State should adopt and I know that Dr. Ailes would be glad to give you an outline of this in a paper some time in the future for us to look to as a model by which we can all profit. It is doing a fine piece of work at LaSalle and we appreciate the work they are doing.

Dr. C. R. Smith, Decatur: I might mention Decatur. We have a hospital in our city, too. It is empty because the osteopaths, chiropractors and other cults want to take patients there. The doctors refuse to practice in the institution, because the irregulars were allowed that privilege. The doctors have all withdrawn their support, and the hospital has remained empty for probably over a year.

## FOREIGN BODIES IN THE RECTUM

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In reviewing the literature with reference to foreign bodies in the rectum, we find that various objects from needles to silver ore have been inserted for various reasons, most of them being due to sexual perversion on the part of the patient. At times, depending upon the foreign body inserted, urinary retention may occur. I wish to report a case of foreign bodies in the rectum in which 1. urinary symptoms were manifested, and 2. the large objects which were inserted.

A male patient, sixty-four years of age, presented himself to his family physician stating that he could not urinate. He also said that he had inserted two glasses into his rectum six hours previous because of an itching in his rectum. Upon being asked to see the case, physical examination revealed some blood oozing from the anal orifice. Digital examination of the rectum revealed two glasses just beyond the internal sphincter; i. e., one glass telescoped into the other.

An attempt to catheterize the patient was without result because obstruction was met before the catheter could enter the urinary bladder.

The patient was taken to the hospital where an attempt was made to remove the foreign bodies after anaesthetizing the anal region by means of a 1% solution of procaine sacraly and later by a general anesthesia. The rectum was dilated as far as possible but we were unable to remove the larger glass although we were able to remove the smaller glass. The smaller glass measured two inches in diameter at its open end, and one and one-half inches at its lower end. It was three inches long.

In attempting to remove the remaining glass, part of the rim was broken off. To prevent the sharp edges from tearing into the mucosa, we inserted a retractor between the glass and the rectal wall at the region of the break.

A posterior slit was then made into the rectum severing both the internal and external sphincters and we were then able to remove the glass without any further damage to the rectal mucosa.

This glass measured two and one-half inches in diameter at its open end, two inches in diameter at its closed end and was four inches long.

The sphincters were then sewed. A small tube covered with gauze and vaseline was then inserted.

The patient left the hospital after two days.

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## BLEEDING FROM THE ANUS

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The discharge from the anus of blood, mucus or pus is an alarming symptom frequently of ominous portent. It always disturbs the patient and bleeding from the anus is not only one of the most frequent signs of rectal disease, but next to pain is the most frequent cause of consulting a physician. Because bleeding is significant of so many conditions its appearance demands our careful consideration, although not infrequently patients call us excited over the color of the stool that has been altered by eating raw meat, blackberries, huckelberries, red wine, bismuth or iron. Bleeding is so commonly associated with hemorrhoids that one is inclined to take too much for granted and neglect to make a thorough investigation.

Blood escaping from the anus may be slight or profuse, occasional or frequent, it may occur during, in the intervals between, or after defecation. It may be discharged as pure blood, fluid blood or clotted blood, or it may be mixed with mucus, pus or feces. Inquiry must be made regarding these conditions and also whether it is mixed in with the feces or only streaks the surface of the mass.

The nearer the source of the bleeding is to the anus the brighter and fresher is the blood, and the further away, the darker and more clotted it is. Blood from the nose, mouth, throat or respiratory tract is usually digested, and hemorrhage from the stomach or small intestine is ordinarily coagulated and incorporated with the food residue and further altered by the action of digestive fluids as to have a black or brownish-black appearance, or may resemble coffee grounds. Sometimes however, if there is active peristalsis, or if the blood is in large amount, it may, even if coming from the upper part of the small intestine, pass so rapidly along that it issues almost unchanged with the stool. As a

general rule, however, bright blood in the defecation comes from the lower colon, sigmoid, rectum or anus, and from these sources is evacuated in a fluid or freshly clotted state.

The bleeding may come from only one blood vessel or from numerous bleeding points or ulcerations, and may be arterial or venous.

The general appearance of the patient is often an index of the importance and severity of the hemorrhage, sometimes the pallor and constitutional disturbances being recognized before the blood appears in the stools. Profound anemia following bleeding from the bowel is of frequent occurrence, and very often immediate transfusion, followed by prompt attention to the lesion causing the bleeding is the only thing that will save the life of the patient. The important fact is, that blood appearing on the fecal mass or voided regardless of its relation to defecation is pathological and is an imperative demand for a thorough rectal examination. The amount or character of the blood lost are no indications of the gravity of the situation, and, although a sharp, severe hemorrhage may demand immediate treatment, the lesser show of blood may be of more serious import and demands fully as careful investigation. Bleeding from the anus is so common that many individuals neglect it long before consulting a physician, and moreover, the physician when consulted may neglect adequate examination so long that serious hemorrhage and even exsanguination may result before proper treatment is given to it. For similar reasons carcinoma is often overlooked until it is too late.

Patients who present the ominous symptom of hemorrhage may occasionally suffer from a benign lesion, and the disease may run a propitious course. The diagnosis of benign bleeding, however, must never be hazarded until all available examinations have excluded the presence of blood dyscrasia, malignant neoplasm or chronic inflammatory process, such as tuberculosis. It is unwise, furthermore, to advance this diagnosis unless the benign lesion can be visualized by direct inspection or palpation. Indeed, even in cases in which a malignant process has been excluded and a benign process demonstrated, the cautious diagnostician will proceed with the knowledge that the patient with a benign cause for bleeding may harbor a malignant disease as well.

Occasionally a single hemorrhage, modest or profuse, is experienced, the origin or causation of which may always remain undetermined.

In the anal canal trauma, fissure, ulcers and hemorrhoids may give rise to blood-covered stools, particularly if the feces are dry and lumpy. Indeed the latter condition alone, in the absence of rectal disease, may abrade the mucous membrane of the rectum or anus so as to cause bloody feces. In children and feeble-minded subjects the possible laceration of the mucous membrane by injury with a foreign body or a large hard fecal mass should be borne in mind.

Thrombotic hemorrhoids frequently rupture of their own accord; and when part of the clot remains protruding, the wound is kept open and is accompanied by a constant oozing of blood until remedied by completely turning out the clot and trimming the edges of the wound.

Fissures or ulcers of the anus cause arterial or venous bleeding, the severity of which depends upon the extent of the lesion and the size of the vessels involved. It usually occurs with every defecation. Patients with fissure give a history of straining at stool, passing a very hard fecal mass, followed by a burning pain and some blood. Some individuals lose only a drop of blood, others a streak of blood on the fecal mass, and others a considerable amount of blood which trickles down the leg. The deeper the ulceration the more severe the bleeding.

Chancres, chancroids, and condylomata bleed very freely when friction is applied by the use of paper after defecation. Condylomata bleed easily, due to friction produced by a fecal movement, by walking, or by rubbing against the patient's clothing, usually when fragments are broken off.

Nearly all rectal disturbances cause some hemorrhage, and the fact that an external abnormality such as a fissure exists does not preclude disease above the sphincters.

Bleeding occasioned by the traumatism of an anal fissure or the ulcerated opening of a fistula is small in amount and irregular in occurrence. In both of these conditions the bleeding may be only sufficient to stain the toilet paper. The contraction of the sphincter muscle closes the blood vessels and prevents much loss of blood.

Persistent bleeding after each bowel movement or that occurring independently of the act of defecation indicates that the source is within the bowel and may be:

1. Internal hemorrhoids very often bleed owing to severe straining at stool followed by rough handling with paper, or when a hard fecal mass is propelled through the rectum and anus, denuding the surface of the greatly enlarged hemorrhoids, engorged with blood to the bursting point. There may be only the expression of a few drops of blood, but sometimes the bleeding is so severe as to cause fainting from exsanguination. Frequently on anoscopic examination, one can see the blood spurt from the ulcerated hemorrhoid. Bleeding from hemorrhoids is usually venous. It may be slight and noticed only on the paper, or it may ooze from the anus for a short time after defecation, or it may be so profuse as to cause the patient to faint from loss of blood while at stool, and become so exsanguinated that death may ensue before the bleeding ceases or can be arrested. When the bleeding is profuse and occurs at frequent intervals, the patient may become profoundly anemic, lose weight, become incapacitated, stimulate cachexia, assume a pale yellow and waxy appearance, become nervous and melancholy; or want to sleep most of the time; and only after operation with or without transfusion, when the patient notices an increase in weight and improvement in color, can he be convinced that he is not suffering from a malignant growth or other incurable disease.

2. Prolapse of the rectum when large and protruding is bruised by the rubbing of the patient's clothing, or when an attempt is made to reduce it and bleeding will often follow.

3. Erosion or ulceration of the rectal wall such as an ulcerated hemorrhoid, or a rectal ulcer (tuberculous, syphilitic, dysenteric) may cause a sharp hemorrhage.

4. Cancer of the rectum or sigmoid, rarely higher up in the bowel, bleeds small quantities of fresh or altered blood in almost every case sooner or later. Severe bleeding may be found, due to the destruction of tissue becoming so deep that it invades the large bloodvessels, sometimes resulting in death from exsanguination. The frequent, offensive and painful stools and the findings by digital and instrumental examination usually reveal the source of the blood.

5. Stricture. The bleeding occasioned by the escaping of the feces past an obstruction usually is small in amount and streaks the stool with sometimes a little loss of free blood after the evacuation. This is regardless of the cause of the obstruction, which may be due to catarrhal disease, tumors of the rectum, or syphilitic or mechanical strictures; but when ulcerating, necrosing masses of tissue are occasionally torn off by the passing mass during defecation, as in cancer, benign tumor or tuberculosis, a very serious hemorrhage may occur.

Cancer of the rectum is usually carcinoma. Sarcoma of the rectum or colon is very rare, and when it occurs, hemorrhage is not a prominent symptom. Saphir[1] reported a large-celled sarcoma.

6. Polypi bleed at every stool, and this bleeding is caused by the erosion of the surface by the fecal mass. They are most frequently found in children. Hemorrhoids are very rare in children, but when a mother says that her child has hemorrhoids or that a hemorrhoid protrudes at stool accompanied with blood and then returns spontaneously or must be returned with the finger, one may be sure that the child is suffering with a single polyp. They are usually low down and can be reached by the finger, or when pedunculated, may be high up and can be located by proctoscopic examination.

7. Multiple polyposis or adenomata are numerous, soft, do not protrude, but give rise to colicky peristalsis, due to an effort on the part of nature to expel them. These evacuatory movements are attended with much blood and very often with a prolapse of the rectum, which, on account of the size of the mass due to the number of polypi, frequently require the services of a physician to reduce. It is important that this condition should be promptly recognized for, if neglected, it usually degenerates, within two or three years, into adeno-carcinoma, in about 50 per cent. of the cases. Constipation is an early symptom followed by diarrhea, with blood, mucus and tenesmus, loss of weight and anemia.

8. Villous growths bleed freely during defecation, but these are very rare.

*Colon Lesions:* 1. Intussusception of the sigmoid with its repeated traumatisms, from the

straining during frequent attempts at defecation, results in inflammation, ulceration and blood with every stool.

2. Strangulated hernia, and, in children, intussusception should be suspected, the latter especially, in the presence of blood-stained stools composed principally of mucus and attended with tenesmus. The sudden appearance of a painful, abdominal tumor (usually in the cecal region), vomiting and severe constitutional manifestations suggest the diagnosis.

3. An acute and unusually severe colitis in children may manifest itself by blood-streaked stools. The various forms of dysentery may have stools which have the appearance of rusty-red fleshy lumps.

Enteritis, the mild follicular or the severe ulcerative form, often produce bloody stools. The associated symptoms, diarrhea, mucus and pain, together with the etiology, dietetic error, typhoid fever, ameba histolytica, must determine the nature of the enteritis.

Hemorrhagic proctitis occurs usually in young adults, and is the cause of profuse bleeding from the rectum with every stool. The blood is bright red and usually in sufficient quantity to produce a severe anemia in the patient. The condition is frequently diagnosed as piles and the patients are often subjected to two or more operations, presumably for hemorrhoids, until a proctoscopic examination shows a dark-red, spongy, ulcerated mucous membrane with blood oozing from numerous ulcerated areas, the whole surface covered with patches of mucus. Ten to fifty stools per day may be voided, many of them nothing more than a small quantity of blood and mucus. In these cases, only the lower four or five inches of the bowel are involved, and the condition is not accompanied with any rise of temperature, as in hemorrhagic colitis, which is generally caused by a pneumococcus infection. These cases are best treated by swabbing the hemorrhagic areas with fuming nitric acid to produce fibrosis followed by a superficial scar, which toughens the mucous membrane, and which prevents any further abrasion that may cause bleeding. Rectal irrigations of 5 per cent. nitrate of silver, or of the colorless hydrastis solution, and calcium lactate or chlorid internally, may be of service.

Cancer or ulceration of the large or small intestine, from whatever cause, as well as the perforation resulting from such ulceration, may explain the appearance of blood in the feces. According to Grainger Stewart, amyloid disease of the intestine may cause hemorrhage.

Corrosive poisons, especially arsenic, phosphorus and bichloride of mercury, may determine the presence of streaks of blood in the passages.

4. The rupture of an aneurysm of the abdominal aorta into the alimentary canal serves to explain some cases of large hemorrhage from the bowel. Aneurysm or thrombosis of the superior mesenteric artery, to which attention has been directed by Watson and Elliott, is a condition which produces tarry or bloody stools.

5. Engorgement of the portal circulation from cancer or cirrhosis of the liver, or autotoxic states such as cholemia and uremia, or as the result of valvular disease of the heart, pulmonary emphysema, or portal thrombosis, demands consideration as a cause of intestinal hemorrhage. In jaundice, whatever its origin, blood may be contained in the stools. In a number of systemic diseases, among them yellow fever, pernicious malaria, dengue, acute yellow atrophy of the liver, septicemia, pyemia, scurvy, tuberculosis and typhoid fever bloody stools may occur in the course of the disease. In typhoid, the passage of mucus streaked with blood is often a warning signal of impending perforation and hemorrhage. Intestinal hemorrhage may be a symptom of leukemia, hemophilia, purpura hemorrhagica and in the occasional sudden diarrheal attacks of exophthalmic goiter, bloody mucus is sometimes present. Intestinal hemorrhage not due to tuberculous ulceration may appear as an intercurrent event in pulmonary phthisis.

6. Injuries of the abdomen, 7. intestinal parasites may give rise to bleeding from the bowel.

8. Hemorrhage may be incident to various neuropathies, 9. vicarious menstruation and 10. burns.

Operations about the anus and rectum are always accompanied by a certain amount of bleeding, the amount depending upon the length and depth of the incision. Incisions placed at right angles to the bowel cause more bleeding than those made parallel to the long axis. When the

bowel is cut at right angles, some of the hemorrhoidal veins and their branches are severed; but when cut parallel to the long axis of the bowel, the incisions are made parallel to and between the vessels, and without injury to them. This accounts for the severe bleeding produced in the cuff operation for prolapse, and in the Whitehead operation for hemorrhoids.

Primary hemorrhage usually occurs during an operation when a vein or an artery is severed and is very profuse, but capillary oozing is easily controlled by pressure. Bleeding may be caused by overlooking a bleeding point during an operation, or because the surgeon thinks that he can control the bleeding by pressure. Some patients bleed easily, due to the diminished coagulability of the blood, or due to some vaso-motor disturbance.

Recurrent hemorrhage is more serious, and generally takes place when a vessel has been injured during an operation and is overlooked, or when a ligature slips or has been improperly or insecurely tied. This takes place within a few hours after operation.

Secondary hemorrhage takes place a few days after the operation (usually five to eight days, when a ligature has cut through a blood-vessel, or it may follow sloughing or ulceration due to burning or pressure necrosis. This occurs in anemic, debilitated patients in those who have coughing, or sneezing, or other conditions causing severe straining or tenesmus; or where the bandage which is supposed to produce pressure is lost when transferring the patient from the operating table to the carriage or from the carriage to his bed; or when the patient, in coming out of his anesthesia, unconsciously plucks away the dressing and releases the pressure bandage. The bleeding in these cases comes on suddenly, is very profuse, and, unless immediately stopped, may prove fatal. Secondary hemorrhage may also occur in the extensive sloughing produced by injection of carbolic acid or in using strong solutions of quinin and urea hydrochlorid for local anesthesia, or in ulceration due to burning or pressure necrosis. Frequently bleeding may be internal, that is the blood flows up into the bowel and is held above the sphincters, and may be fatal while nothing is noticed from the anus. Slight bleeding or oozing may be easily arrested. Profuse hemorrhage is always accompanied by well marked and classic symptoms. The external evidence of bleeding is a sudden gush of blood from the rectum, which saturates the dressings and even the bed, and on removal of the dressings a stream of blood will be seen issuing from the anus. When the hemorrhage is internal, large quantities of blood accumulate in the rectum, become clotted and cause a desire to go to stool, and there is an evacuation of liquid or clotted blood or both; and when retained for any length of time it has a coffee-ground color and a foul odor. This may be accompanied with colicky pains and typanites along the entire course of the colon, due to the decomposition of blood and to gas formation. Frequently internal bleeding manifests itself by an intense desire to urinate, with an inability to void due to distention of the bowel. If this form of hemorrhage is not quickly discovered and arrested, the patient gets a death-like pallor, has an anxious and worried look, calls for much water, gets air-hunger, becomes faint and then unconscious. The pulse becomes rapid, but is soft and thready, gradually becomes imperceptible, the patient collapses and dies of complete exsanguination.

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## MAGGOT TREATMENT OF OTEOMYELITIS*

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During the World War, Dr. William S. Baer had occasion to treat two soldiers suffering from compound fractures of the femur with large flesh wounds. These patients had been exposed on the battlefield for seven days and they were found to be in a deplorable condition, with their wounds filled with maggots. Upon the removal of the maggots, Baer was surprised to find the wounds to be clean with healthy granulation tissue forming.

In 1928, in view of this wartime experience, Dr. Baer employed maggots in the treatment of several cases of chronic osteomyelitis in which there had been repeated operation and recurrence, extending over a period of from one to five years. He reported that in all of these cases

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healing occurred in about six weeks; but, inasmuch as there had been no attempt at sterilization, there was secondary infection in some of these cases, with tetanus and the gas bacillus of Welsh being the chief bacterial offenders. Baer was surprised to note, however, that while gas bacilli were found in the wound, they appeared to cause no systemic reaction.

Experimenting on a group of guinea pigs, he traumatized the bone and periosteum and injected gas bacilli into the wounds. The animals promptly died from gas bacillus infection and gas bacilli were recovered from their organs. Then six other guinea pigs were inoculated in the same manner and the wounds were tightly closed so as to make them as nearly anaerobic as possible. At twelve hours, sixteen hours and twenty-four hours later the wounds were opened and maggots were introduced. All of these animals made rapid recovery with complete function of the infected parts. Baer's inference was that maggots would overcome gas bacillus infection in a wound provided the maggots were free from gas bacilli when inserted into the wound.

In his cases of tetanus infection, the wounds were immediately cleansed and antitoxin was given. Two of the patients with tetanus infection developed severe symptoms and one of them died. This impressed Baer with the necessity of developing some method by which sterile maggots could be obtained. He found that the outside of mature maggots could be sterilized; but that the bacteria in their intestinal tracts would continue to contaminate the wound. It was found that the best method was to sterilize the eggs.

By sterilizing the eggs and permitting them to develop on sterile food, it was possible to produce sterile maggots. The eggs were sterilized by placing them in a solution consisting of 1 to 2,000 bichloride of mercury, 25 per cent. alcohol and one-half of one per cent, hydrochloric acid. The eggs remain in this solution for thirty minutes, after which they are washed with sterile distilled water. They are then placed in an incubator, on sterile food, consisting of ground beef, ground liver and yeast, previously sterilized in an autoclave. The eggs hatch in from eight to twenty-four hours, forming the larva or maggot. The larva changes into a pupa in from five to seven days and the adult fly emerges in from seven to ten days.

Regardless of the care in preparation, the sterility of the maggots should be proven by culture before they are used. This may be done by taking a scraping of the food including one or two maggots, crushing them and making both aerobic and anaerobic cultures. If desired the maggots may be stored for several days by placing them in bottles containing sterile food, in a refrigerator at a temperature of 40 degrees Fahrenheit. At this temperature they become inactive and cease to grow.

In preparing the wound for maggots, it must be borne in mind that, while maggots have a remarkable appetite and have a predilection for necrotic tissue, there is a definite limit in the amount of food they can ingest. The surgeon must do his part. This means that a wide exposure of the infected part must be made with as complete removal of all necrotic tissue as possible. It is only expected that the maggots will clean up what the surgeon is unable to remove.

No antiseptics should be used in the wound as they would impair the effectiveness of the maggots. The wound should be packed with vaseline gauze for twenty-four hours to control hemorrhage. The skin surrounding the wound is then covered with a layer of collodion to protect it from secretions and to prevent the itching sensation caused by the maggots crawling over the surface. The wound is then filled with sterile maggots.

Maggots, as obtained from your laboratory, usually come in bottles containing approximately 1,000 with sufficient sterile food to maintain them. They are packed in dry ice for shipment so that they are at about a two-day growth when they arrive. The bottle should be filled with cool saline solution and the maggots poured onto a piece of gauze. They can then be gently scraped into the wound. Possibly an easier method is to trim the excess gauze leaving only the small portion containing the maggots, and laying this on the margin of the wound. The maggots can then crawl into the wound themselves. The gauze should not be placed directly in the wound,

as it would act as a plug, shutting out the light and tending to dam up secretions.

A wire cage is next fastened over the wound to imprison the maggots. This cage is made of very fine bronze wire of about 80 mesh. A coarser mesh will permit the small maggots to escape. Strips of sponge rubber should be fastened to the edges of the screen to assure close approximation with the skin. It is best to use strips about an inch wide which have been split longitudinally. The edge of the wire mesh is inserted between the rubber and sewed snugly. The cage should be fastened firmly over the wound with adhesive strips and the wound should be observed daily to see that the tape does not become loosened. If a coarser screen is used, it is necessary to cover it with muslin for twenty-four hours to confine the maggots; but after that time, they will have grown sufficiently so that the muslin covering may be removed. It is better to have the cage open and exposed to the light and air, as the maggots seek the dark and will burrow more deeply.

The maggots may be left in the wound for five days, at which time they should be removed as they will soon change into the pupa stage. The wound is irrigated with saline solution and the maggots are washed out as thoroughly as possible, those remaining being picked out of the wound with forceps. A few will remain buried in the tissues, but will wander out during the course of the day and can be removed at the next dressing. It is well to allow two or three days to elapse between plantings so as to permit the skin to recover, as there is usually some redness and excoriation due to the secretions from the wound.

During the interval between implantations, the wound should be packed with vaseline gauze to keep it well opened. A prophylactic dose of anti-tetanic serum should always be given at the time of the first implantation as a matter of extra precaution.

There is usually a profuse, serosanguineous discharge from the wound while the maggots are present which promptly subsides when the maggots are removed. There is also usually a rapid rise of temperature to 102.5 to 103 degrees; but this also subsides with the removal of the maggots. The treatment is not without pain; but it is rarely necessary to resort to opiates provided the skin has been properly protected. This pain is described as a sharp, intermittent stab, similar to many small electric wires in which the current is turned rapidly off and on.

Under this treatment, it is surprising how quickly wounds become clean and begin to heal from the bottom with healthy granulations with cessation of the discharge of pus. It is generally believed that two factors are responsible for these results. Aside from the mechanical action of the maggots in ingesting and digesting the necrotic tissue, it is believed that an active principle is developed by the maggots when in contact with the tissues. This is probably an autogenous bacteriophage. Working on this theory, Livingston and Prince, of Hines Hospital, have succeeded in obtaining this active principle by grinding live maggots in sterile saline solution and passing this through a Berkefeld filter. They report several cases, treated with this active principle, which have responded favorably. In some cases they made use of an autogenous vaccine in connection with it.

In tuberculous osteomyelitis, the reaction appears to be much more pronounced than in the ordinary type. Often the temperature rises to 105 or 106 degrees and frequently it has been found necessary to remove the maggots on the third or fourth day on account of this severe reaction. These cases are usually very chronic, with sinuses which have drained over a period of years and they present the usual picture of cachexia and anemia. It is probable that the distinctly lowered resistance of the patient accounts for the unusually severe reaction. However, the sinuses fill in rapidly with healthy appearing granulation tissue and the wound soon closes. In fact, it has seemed to me that these wounds are disposed to fill in too rapidly for the chronic type of infection and I am of the opinion that it may be wiser to pack the wounds frequently and to slow up the healing process.

The following case fairly represents the typical course in the maggot treatment of tuberculous osteomyelitis. The patient is a male, aged 16 years, with multiple sinuses of the left hip which had been draining for three years. The patient was operated on Nov. 20, 1931, at which time the sinuses were opened widely and a large amount of scar tissue was removed. No necrotic bone

was removed. Four implantations of maggots were made at weekly intervals. The reaction was severe after each implantation, with temperature ranging from 103 to 104 degrees. Maggots had to be removed from the wound after three days because of this severe reaction.

After the fourth implantation, the wound had filled to a point where it was not practicable to continue the maggot treatment. It was noted at that time that the granulation tissue was soft and spongy and it was thought that the wound would not remain healed. Two weeks later the wound opened for the second time and six more implantations of maggots were made. This time the wound took on a more healthy appearance and solid granulation filled the wound and completely closed it with the exception of a very small sinus which no longer discharged. It is quite possible that this small sinus will close in the near future.

The patient's general condition has improved materially since the treatment was undertaken. He has gained five pounds in weight and his red count has increased from 3,600,000 to 4,800,000. The white count is normal and the hemoglobin has increased from 70 to 80 per cent.

In a series of fourteen cases, in all of which there have been draining sinuses for from two to nine years, about 40 per cent. are completely healed while the remainder, with one exception, have a single small sinus with no discharge. In one case, with extensive involvement of the tibia, there is an active sinus draining from the lower epiphysis. This is probably due to too conservative surgical treatment in an attempt to save the ankle joint. This case will require a second operation.

While the maggot treatment is not to be expected to cure tuberculous osteomyelitis, the striking feature in all cases has been the rapid and pronounced improvement in general health.

There has been definite gain in weight and strength in all cases. The secondary anemia has shown constant improvement, the increase in red cells averaging 1,000,000 in the course of four to six weeks, with a like increase in hemoglobin. In several cases in which there was leucocytosis, the white count has returned to normal. At least, this method of treatment will prove a valuable aid in the treatment of tuberculosis osteomyelitis, by clearing up the secondary infection and in allowing nature a better opportunity to combat the primary disease.

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DISCUSSION

Dr. J. A. Cousins, Chicago: It seems as though the lowly maggot is coming into its own by the work of this group. We tried it in one case of luetic osteomyelitis. It seems that this type of case was disagreeable to the maggots and we could not keep them in. They burrowed under the adhesive tape, under the skin and out from under the adhesive. We found them in the bricks we used for elevation of the bed. After the patient went home she told me she found the maggots in her clothes.

Dr. S. L. Governale, Chicago: I would like to ask Doctor Staben if he uses the method in joint diseases. When Dr. Livingston delivered his first lecture on maggot therapy he informed us not to use it in joint tuberculosis or joint diseases of any sort.

In one case of mine of osteomyelitis of the olecranon process where the entire bone was destroyed, the maggot treatment was employed with good results.

Five applications of maggots were necessitated to arrest the pathology of the olecranon process. The wound was completely healed in five and one-half weeks.

Lieut. Commander M. D. Willcutts, Great Lakes: At Great Lakes we have used the maggots and their active principle for the past two years and we had very good results we thought. Lately we are finding recurrences after apparent arrest or cure for 15 to 18 months. In lesions of the sternum and of the skull, the maggots cannot be safely employed because they may crawl into spaces such as the mediastinum and epidural. We have been favorably impressed with the active principle as a stimulant to promote granulations.

Dr. G. W. Staben, Springfield (closing the discussion): In regard to the maggots not staying in the wounds, I have not had any personal experience. I think Dr. Kreuscher made some suggestions as to bleeding and excessive secretion which may explain why they did not stay in. Other than that I do not know why they did not stay. I have had an occasional implantation that would not live. Ordinarily they live.

About using maggots in the joint, I have used them in tuberculosis of the hip and other joint cases and they have had no bad effect upon the joint. As Dr. Kreuscher said, you cannot put a mass of maggots in an old sinus and expect them to clean it up. You have to clean it up surgically.

I agree with Dr. Kreuscher in regard to the active principle. I hope that is going to be ultimately worked out so that we will not have to use the maggots but will have a method of treatment that will be less disagreeable to the patient.

In regard to the recurrences, my cases are relatively over a short period. I have not been using the maggots any longer than eight or nine months. I have been using the maggots more in tuberculous osteomyelitis than in the ordinary type, though I have used it in some of the latter. I do not want to leave the impression that I believe the maggot treatment in tuberculous osteomyelitis is going to cure tuberculosis of the bone. I do not think it will do anything of the sort. The thing that impressed me is the rapid improvement in the

general condition of the patient. I think it will clear up the secondary infection in a much shorter time and then leave us free to fight tuberculosis. Almost invariably there has been a marked improvement in the general condition of the patient, both in appearance, blood count and weight. All those things are to be considered.

## A CRITICAL STUDY OF THE VARIOUS PREGNANCY TESTS*

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Positiveness in the diagnosis of pregnancy is always to be desired, but it is not always attainable. To differentiate between early pregnancy, ectopic or intrauterine, and the pathological and physiological conditions that simulate the pregnant state requires skill that even the most expert obstetrician at times finds himself lacking. This same condition likewise prevails in late pregnancy when ovarian cysts and uterine fibroids complicate the picture.

Some of the more common conditions that, because of the attendant amenorrhea, often mimic pregnancy are: pulmonary tuberculosis, primary and severe secondary anemias, psychosis, endocrine and metabolic disturbances. Similarly abnormal bleeding associated with salpingitis is frequently attributed to ectopic pregnancy. Early menopause and the amenorrhea of lactation are sources of concern to patients.

Inability to always arrive at a definite conclusion in regard to pregnancy is due to a few easily understood factors. First, until recently there was no reliable information of value to be had in the first three months. Secondly, even in the latter months the positive signs of pregnancy, i. e., fetal heart tones, fetal parts and fetal movements might be absent or obscure due to the death of the fetus, the presence of too much fat, abdominal tumor, ascites, or failure of the patient to cooperate by relaxing the abdominal muscles and thus facilitate the examination. Thirdly, an important factor is the distortion of the truth by the patient—either if pregnant to cause the obstetrician unknowingly to produce an abortion or, if not pregnant, to obtain a positive statement from the examiner for ulterior purposes. She may, therefore, give a history containing all the symptoms of pregnancy and may go so far as to attempt to produce fetal movements by contracting the abdominal muscles. In like manner the desire for children may be so intense that the patient is able to delude herself into the belief that she is gravid and thus relate a story to fit the exigencies of the case.

No effort will be made in this paper to go into an academic discussion of the signs and symptoms of early pregnancy, other than to name them and no effort to discuss those of latter pregnancy—since we are for the most part concerned with the diagnosis within the first trimester. Therefore, it is sufficient simply to mention only the signs and symptoms of this period: cessation of menstruation, morning sickness, salivation, bladder irritability, symptoms of pelvic congestion, change in disposition, formation of secondary areola, tingling in breasts associated with their enlargement and the appearance of lineae albicantes, bluish discoloration of the vulva, vestibule and vagina, softening of the cervix and change in form, size, consistency and position of the uterus.

In view of the fact that the above signs and symptoms are subject to error and hence not wholly reliable, it becomes obligatory to seek elsewhere for more positive information. This we find in certain laboratory and experimental work as uterography, x-ray and biological tests.

*Lipoidol-Uterography.* Uterography is the injection of an opaque media as lipoidol into the uterus and the taking of an x-ray picture immediately after. This test, because it is not devoid of danger, should be done only after a painstaking physical examination plus biologic tests have failed to yield the desired information.

The possibilities of such work in early pregnancy were first made known by Heuser and later accidentally observed by Nahmmacher. Since that time much work has been done in this direction and the literature is replete with both successes and failures.

Heuser states that the injection of lipoidol into a pregnant uterus does not interrupt the pregnancy. Nahmmacher is of the opinion, after much experience, that the injection in early months will not interrupt or disturb a pregnancy.

Jarcho's only reason for not using this method

*Read before the John A. Andrews Clinical Society. Tuskegee, Ala.

was not through fear of an abortion but rather the fear of doing injury to the child. Arnstein, Reinberg, Schneider and Eisler likewise reported no abortions in their cases. Miller and Martinez report fifteen cases with three abortions occurring three, four and five days following injection. Rucker reporting on thirteen cases had only one abortion. In our series of twenty cases there have been no abortions to date. Ten cases have come to term and the children showed no ill effect, being apparently normal and well developed.

The antagonists of this method of diagnosis fail to realize that in early pregnancy after the ovum has become imbedded in the uterus the uterine cavity, as such, remains separate from the membranes and decidua. Hence the problem is to avoid injury by instrumentation to the decidua. This is accomplished by introducing, preferably a soft Nelaton catheter or a Keyes canula carefully into the uterus and allowing the lipoidol to flow with the least possible pressure on the syringe.

Pregnancy is indicated on the roentgenograms by the filling defect or bulging in the cavity of the uterus. It is felt that with sufficient care and in selected cases uterography can serve as a diagnostic aid in early pregnancy.

*Roentgen-Ray.* The second source of reliable information is the roentgen-ray. Matthews has shown that exposure to the x-ray in the case of pregnancy is fraught with little danger to the fetus regardless of its stage of development. His report is based on roentgenograms of 306 pregnant women, some exposed 4 to 6 times and associated with follow-ups over a period of five years. It is his opinion that all of the proved cases of fetal malformations assigned to irradiation have been cases treated with therapeutic doses for pathological reasons and not simply for the making of a plate.

Murphy after some exhaustive work on the effect of x-ray in pregnancy on present and future pregnancies came to the conclusion that structural defects do occur to the offspring if irradiation is done after pregnancy has occurred but that there is no definite indication to prove that irridation done prior to conception produces any ill effect on the child. In addition his work was done for therapeutic reasons and not simply diagnostic purposes.

As yet we have had no ill effect in any of our cases and have not failed to make use of this procedure when indicated.

The conditions for which we used x-ray as an adjunct in diagnosis were, 1. early diagnosis of pregnancy 14 to 18 weeks when for any reason a positive diagnosis was uncertain; 2. multiple pregnancy; 3. diagnosis in the obese women of 200-300 pounds when it is impossible to outline fetal parts or obtain the fetal heart tones or palpate the uterus bimanually satisfactorily; 4. where a fibroid was suspected as complicating the pregnancy, and 5. whenever a monstrosity or polyhydramnion was suspected.

The results obtained, however, with roentgenograms are not always gratifying because even in the early months several factors act as inhibitory agents. The thickness of the mother's abdominal and uterine walls, the respiratory excursions of the mother, liquor amnii which is radio opaque, insufficient density of the embryonic bones, the circulating blood in the uterus and placenta, which Bartholomew estimates absorbs 60 per cent. of the rays, and movements of the fetus which blur the films, all tend to render the diagnosis uncertain.

Despite these hindrances, Matthews has quite definitely proven that in early pregnancy before the ordinary signs are of value the x-ray is of definite aid in that it yields a positive diagnosis from 14 to 15 weeks in 15 per cent. of the cases, 16 to 18 weeks in 75 per cent. and after 18 weeks 100 per cent. results. Stein and Arens after considerable experience and experimentation with x-ray as a diagnostic aid for pregnancy at three, three and one-half and four months and on to term, believe that it is impossible to arrive at an accurate diagnosis prior to mid term.

Our results have not been so promising but the success we have obtained warrants the belief that with better technique and equipment, this method of diagnosis will prove of inestimable value. The following cases typify our work:

Case 1, M. J. A 27-year-old primipara, who menstruated 3 months ago and who gave a history of having had no nausea and vomiting and no increased frequency of urination. Upon examination no colostrum was found in the breasts and no Chadwick's sign was present. The uterus was enlarged to the size of approximately a 3 month's pregnancy. She was referred to the x-ray department in order to differentiate between a fibroid and pregnancy. The x-ray report was negative for pregnancy.

Case 2, C. J. A para-II, who stated that she menstruated last June 28, 1930, was examined September

18, 1930. Because of obesity, 227 pounds, no definite diagnosis could be made. X-ray and lipoidol injection revealed no pregnancy but a fibroid.

Case 3. A middle aged primipara who gave a history of an amenorrhoea for 3½ to 4 months duration associated with slight morning nausea. Upon examination slight breast changes were noticed and the uterus extended almost to umbilicus. There was no fetal heart tones and no palpable fetus. She was sent up for a roentgenogram in conjunction with a biologic test and to rule out a uterine fibroid. The roentgenogram revealed fetal bones.

*Biologic Tests.* There are three biologic tests for pregnancy, one of which seems more reliable than the other two and none of which constitutes any danger either to the mother or the fetus. From a conservative viewpoint these tests are of more value than those previously described. The rationale of them all depends upon the effect of either the anterior pituitary or female sex hormone contained in the blood or urine of a pregnant woman upon the generative organs of female mice and rabbits.

Any skepticism on the part of the medical profession toward this method of determining early pregnancy is not unwarranted for the enthusiasm was great a few years ago for the methods of Abderhalden, Kamnitzer and Dienst, all of which later proved faulty.

However, the most important of the biologic tests, that of Ascheim and Zondek, while only a few years old, has yielded excellent results for all who have experimented with it.

*Female Sex Hormone Test.* The female sex hormone test depends upon the demonstration of a mouse unit of female sex hormone in 10 cc of whole urine by the Allen and Doisy method. The basis of the test depends upon the succession of cell types found in the vaginal lumen of white mice during estrual cycle. The technique consists of injecting 2 cc of catheterized urine into two spayed adult mice five times over a period of two days and observing the vaginal spread—a spread showing a preponderance of non-nucleated squamous epithethial cells and an absence of leucocytes indicates pregnancy.

This test is not especially difficult to perform and is inexpensive, since the animals will endure five or six series of injections. The readings or interpretations of the spread must be accurate. The element of error is due to a faulty interpretation of the spreads and the abrupt and delayed reactions.

*Siddall Test.* This test depends upon the effect of anterior pituitary and to a smaller degree upon the female sex hormone contained in the blood serum of pregnant women on the genital tract of immature mice.

One cc of blood serum is injected subcutaneously into an immature virgin white mouse for five days daily. On the sixth day the animal is killed, the uterus and the ovaries are dissected out in one piece, and their weight in miligrams is determined on a chemical balance. The weight of the mouse is divided by the weight of the ovaries plus the uterus and the resulting quotient determines the presence or absence of pregnancy. Such a quotient of 400 is indicative of pregnancy and above 400 is negative for pregnancy.

In addition to the increase in size of the uterus there often develops a corpus luteum and corpus hemorrhagica showing that even in the blood stream the anterior pituitary hormone is present and contributes in no small measure toward the enlargement of the uterus in test animals. Hence the female sex homone in the woman's blood stream are responsible for this uterine enlargement.

*Manoiloff Test.* Another test worthy at least of mention is Manoiloff's. This is a seroreaction suggested to be due to an increased $P_H$ of the blood serum during pregnancy in which he claimed success in 92-96 per cent. of his cases. To .3 cc of fresh clear serum he adds 1 cc of 2 per cent. aqueous solution of theobromine sodiosalicylate, shakes the mixture, then adds a drop of .2 per cent. alcoholic solution of nile blue and again stirs the mixture. From several minutes to an hour the mixture decolorizes and appears yellow or pinkish yellow if the woman is pregnant; if not pregnant the mixture is blue, bluish or pinkish blue. This test, however, has proven unreliable since the color changes vary considerably and a clear differentiation between positive and negative is very difficult. Fretwurst and Otto using Manoiloff's technique found only one positive in 41 observations in the first trimester; 35 per cent. were positive in the second trimester and 61 per cent. in the third trimester. These workers discredit Manoiloff's theory that the reaction is due to an increased $P_H$. White and Severance are of the opinion that this reaction has little value as a diagnostic aid.

*Aschheim-Zondek.* The work of Erdheim and Stumme demonstrated that the hypophysis hypertrophied during pregnancy, while that of

Aschheim-Zondek showed that the anterior lobe secreted a substance capable of initiating growth of immature ovaries. The hormone is present in the urine and when injected in immature female mice or rabbits, ovulation occurs. This test is more reliable than most serologic tests in that the hormone is demonstrable in the urine in any case in which there is or has been a pregnancy and in the latter condition some of products of conception remain.

In mice the time required is 100 hours and the mice must be healthy immature females—3-5 weeks of age; older ones may not be immature and younger ones do not bear the injections well. The mortality rate of mice is at times quite high due either to the fact that the mice are too young or that the urine is toxic. Some urine, although not all, may be detoxified by the ether detoxicating method of Zondek.

The mortality rate in rabbits may be high, also, and here the toxicity of the urine plays an important role, as well as the lack of resistance of the animals themselves.

In all cases, whether mice or rabbits are used, the urine is a fresh morning specimen devoid of preservative. If rabbits are the animals used, the technique followed may be either according to Schneider or to Friedman. In the former method five to seven cc of properly collected urine is injected into the marginal vein of the ear of the rabbit, no sterile precautions being required. Thirty hours later the animal is killed and autopsied and the ovaries macroscopically, or, if in doubt, microscopically studied. If the Friedman method is the one of the choice then 4 cc of urine is injected intravenously into a nongravid mature female rabbit three times daily for two days and the ovaries are examined forty-eight hours after the first injection. Reinhardt and Scott have utilized a further change in the technique used, in that the rabbits are not killed but are laparotomized and used for subsequent tests. Regardless of the technique used the test is positive when corpora hemorrhagica or corpora lutea are found, and negative if only clear unruptured follicles are present. It should be remembered that the test to be reliable must be made on a healthy animal. The advantage gained by using rabbits is that the doe does not ovulate until she copulates, that the corpus hemorrhagica is not found in a non-pregnant rabbit and when found means that this reaction is due to the presence of the anterior pituitary hormone found in urine of a pregnant woman.

With mice five are required to a test since with this number the source of error that might exist due to animal peculiarities is greatly minimized. Three cc of urine is injected subcutaneously two times a day for three days, 6 injections in all and after 100 hours the mice are autopsied and the ovarian changes noted. A positive diagnosis may be made as early as 5 days after the last menstruation. A pale grayish-pink mouse ovary about the size of a pinhead is a negative result. An ovary enlarged 2-3 times its normal size may or may not be red in color, and studded with yellowish or cyanotic protusions-corpus lutea and hemorrhagica is indicative of pregnancy. Microscopically the ripening of new follicles and luteinzation of old ones is likewise characteristic of the positive reaction. It is not necessary to kill all animals since a positive reaction in the first mouse examined is sufficient for the diagnosis of pregnancy. However, if the first is negative or doubtful, all animals should be autopsied.

In our series the above technique was followed: Urine from known pregnant, known non-pregnant women, males and unknowns were used. In the case of unknowns the tests were completed and these reports checked with later examination of the patient when a clinical diagnosis could be made. The period of time after the last menses ranged from 5 days to 8 months. It was observed that the reaction was strongest in the early months of pregnancy, decreased as term approached and usually disappeared 1 to 2 weeks post-partuum.

*Results:* Aschheim reported an error of 1.6 per cent. in a series of 258 control urines. Robertson reviewing 2,368 cases as studied by thirteen different investigators reported an error of 1.47 per cent. Mazer and Hoffman found sixteen positive reactions in 164 observations on non-pregnant women. Mack has reported 98 per cent. accuracy on 500 Aschheim-Zondek tests. In our series of 350 cases we grouped them according to technique used. One hundred twenty-five observations were made with the Schneider technique, 125 with that of Freidman and 100 using mice as the test animals. Of the 125 observations made with rabbits utilizing Schneider technique, twenty-five were pregnant women, ten non-pregnant and 90 suspected pregnancies. In

the pregnant and suspected pregnant groups the reactions were positive and later clinical evidence confirmed the reaction. In the non-pregnant group two observations were positive.

Of the 125 examinations in which the Freidman test was used there were 25 pregnant cases, 90 suspects and 10 non-pregnant cases. Of this group the reaction agreed with the clinical evidence in each instance, except two cases in the pregnant group. However, when the test was repeated the reaction was in accord with the findings. Just why the reinjection of urine and subsequent examination of the ovaries thirty-four hours later will yield a finding reverse to a prior one, is uncertain; however, we feel that it is due to the variation in the concentration of the pituitary hormone in the pregnant woman.

One hundred observations were made using mice as the test animals. Seventy-five of these observations were made on suspected pregnancies and twenty-five on non-pregnant individuals. In the non-pregnant group there occurred five false reactions, two of which could be accounted for since one case was of chorionepithelioma, and one of pelvic inflammation. The causes of error in the remaining three cases possibly were due to the number of mice used and the number living at time of autopsy, for in some cases only two or three mice were used instead of five and since it is known that all mice do not react alike, it is quite possible that those who did react correctly died and the recalcitrant ones lived and to the compensatory pituitary hyperfunction associated with ovarian deficiency.

Case 1, M. W. Aged 37, para-IV, was seen in the out patient department February 19, 1931. She gave a past obstetrical history of 3 miscarriages, one at 3 months, one at 4 months and another at 4 months; the last one occurring January, 1929. She menstruated last October 28, 1930. On examination colostrum was found in the breast, the cervix was hard, and two masses were felt, one the size of a grape fruit lying in the cul-de-sac and a larger one extending to the umbilicus. An Aschheim-Zondek test advised in order to differentiate between fibroid and pregnancy or the presence of both, was negative for pregnancy. Four months later she was operated on for multiple fibromyomata of the uterus and no fetus was present.

Case 2, G. W. Aged 38, para-VI, came into the clinic July 10, 1931, complaining of cessation of menses, pain in abdomen, enlarged abdomen. Following an examination in April a diagnosis of fibromyomata uteri was made. Painless menstruation occurred regularly up until four months ago. Since that time morning sickness and nausea has been present and the breasts have been enlarged. She was examined by another doctor who confirmed the previous diagnosis and thought that patient was pregnant in addition. He advised an Aschheim-Zondek test. Since cessation of menstruation, at the usual time of each succeeding period she has had severe cramplike pains but no menstrual flow. These attacks have increased in severity and four days prior to entry pains became very severe and bearing down in character occurring at regular intervals. So severe were these pains that the patient was unable to sit down and moved with the greatest difficulty. There was no bleeding but a spasdomic leaking from vagina and urethra. Menstruation began at 12 years, regular every 28 days, lasting from 4-5 days, last period March 18, 1931. She had one normal delivery and five abortions at two and one-half months, five months, one month, and six weeks. Physical examination essentially negative, except for an enlarged abdomen. A large nodular intra-abdominal mass extended about two fingers above umbilicus with one nodule distinctly felt just below the gall bladder and another about the size of an orange in the left upper quadrant. Between these two nodules was a soft globular mass, fluctuating, which did not extend to the height of the two nodules. In the left lower quadrant was palpated another mass about the size of a lemon extremely tender and movable. On vaginal examination the cervix was soft, patulous, 3 cm. in length and pushed up against the pubic arch. A large hard nodular mass firmly adherent filled the cul-de-sac and over 4/5 of the pelvic canal. Blood pressure 110/68, urine negative, red blood count, 3,890,000; white blood count 10,300; H. B. 80. An Aschheim-Zondek test was done which was positive for pregnancy. Before the test could be completed five mice, and six rabbits were used. A high animal mortality necessitated the use of this number of animals. Some of them died during the process of injection and others died from four to twelve hours later from what appeared to be an aniphylactic reaction. Because of the intense pain suffered by the patient, a laparotomy was done and a multiple fibromyomata uteri and a pregnancy of about four month's duration was found.

Case 3, L. J. Primipara, aged 33, entered for medical service at hospital December 30, 1930, complaining of discomfort in abdomen, frequent belching, headaches and amenorrhea, vaginal bleeding past two weeks and enlarging abdomen. Because of latter condition she was referred to the obstetric service. She had never had a regular menstrual history since menses began at 14, averaging 7-8 per year. Her last period was October 22-30, 1930, with spotting one day in November. She remained amenorrheic until December 17. At this time she began flowing and continued until December 22, 1930, when the flow became copious. Physical examination essentially negative except for hard nodular abdominal mass continuous with cervix and extending almost to umbilicus in mid-line. No fetal heart tones or souffle heard. No vaginal or cervical discoloration or cervical mucous plug seen. Urine negative, red blood count, 2,750,000; white blood count 13,600; x-ray negative for pregnancy. Aschheim-Zondek test was positive for pregnancy. January 8, 1931, patient complained of sharp intermitten pains transversely across lower abdomen associated with

passage of a few small clots. January 11, 1931, patient aborted.

Case 4, E. T. Primipara, aged 24, gave a history of having menstruated last June 1, 1930, and of no nausea and vomiting, dizziness, headaches and visual disturbances. An examination, February 19, 1931, revealed a slight uterine enlargement, a hard non-patulous cervix, no Chadwick's sign and no breast changes. An Aschheim-Zondek test was negative for pregnancy.

Case 5, M. C. Primipara, aged 23, came to the clinic October 12, 1930, with the history of having menstruated last July 20, 1930. No nausea and vomiting and no other symptoms of pregnancy. Examination revealed a uterus soft, enlarged, size of two months' pregnancy Aschheim-Zondek test was positive.

Case 6, L. D. Primipara with a history of regular menstruation. She menstruated last, February 17, 1931; on the fourth day after the missed period the patient decided she was pregnant, and insisted that an Aschheim-Zondek test be made. No nausea and vomiting, no colostrum in breast. An Aschheim-Zondek test was positive and one month later patient aborted a two months fetus.

These cases are typical of some of the problems of diagnosis which may be readily cleared up by means of this test.

*Summary.* 1. The diagnosis of pregnancy either early or late is at times quite difficult.

2. Uterography, while potentially dangerous, yet when carefully done is valuable as a diagnostic medium in early pregnancy.

3. X-ray, though subject to technical difficulties, is of immense value as an adjunct in the diagnosis of pregnancy.

4. The biologic tests yield the more certain results and are devoid of danger to both mother and child. The Freidman or Schneider modification of the Aschheim-Zondek test is to be preferred to all other modifications because of its accuracy and availability of the animals used since rabbits are easier procured and it is not necessary to determine rigorously their weight. Moreover, it is not necessary to kill the animal and the same animal may be used in other experiments. The reaction is macroscopic and response is rapid, requiring only fifteen to forty-eight hours.

5. A negative finding does not preclude the possibility of pregnancy, repeated negatives are reliable.

CONCLUSIONS

1. Since all methods known up to present time for the diagnosis of early pregnancy are uncertain and unreliable, the obstetrician is justified in exhausting various laboratory tests for aid.

2. In the order of reliability and danger to fetus and mother the value of tests are in the following order: Biologic, x-ray and Lipoidol.

3. The Aschheim-Zondek is accepted as the most reliable of the biologic tests and most observers agree that its results are accurate.

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# DEAFNESS AND BLINDNESS*

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I have chosen to discuss some of the diseases and conditions met with in the care of the children at the Illinois Schools for the Deaf and Blind at Jacksonville. It has been my privilege and duty to serve as attending physician at these institutions for the past two and one-half years.

I have chosen to discuss these problems because there is a general lack of appreciation of their importance. The extent of the worlds of deafness and blindness is known to only a few. We consult the census statistics regarding deafness and find that there are listed 45,000 deaf mutes. This figure only includes those who were congenitally deaf or acquired deafness before the age of 8, as those acquiring defects in hearing after that age retain their ability to talk. It has been estimated that 10 per cent of school children suffer from some defect in hearing. It has been estimated also that there are 3,000,000 school children in the U. S. who have subnormal hearing and that there are 10,000,000 persons with some defect of hearing.

The same may be said of blindness though the figures are not so large. There is, however, a large percentage of our school children who suffer from defective vision.

By way of introduction and so that you may have a brief review of some of the causes of blindness and deafness I have prepared a few lantern slides showing the reasons why these children are being taught where they are.

## CAUSES OF BLINDNESS

| | | | |
|---|---|---|---|
| Optic nerve atrophy | 47 | Phthisis bulbi | 3 |
| Cataracts complicata congen. | 34 | Discoloration of lenses | 3 |
| Keratitis congenital | 26 | Anophthalmus | 2 |
| Ophthalmia neonatorum | 24 | Iridochoroiditis | 2 |
| Choroiditis and retinitis | 15 | Iritis | 2 |
| Injury | 14 | Retinitis pigmentosa | 2 |
| Myopia | 10 | Keratitis interstitial | 2 |
| Glaucoma | 10 | Keratoconus | 2 |
| Buphthalmus | 8 | Iridocyclitis | 2 |
| Undermined | 7 | Retinitis plastica | 1 |
| Albinism | 7 | Leucoma adherens | 1 |
| Ophthalmia sympathetica | 6 | Conjunctivitus diphthericus | 1 |
| Microphthalmia | 5 | Trachoma | 1 |
| Coloboma choroideal iris | 4 | | |

You will note that optic nerve atrophy leads the list of causes of blindness. And that congenital cataracts follow as a close second. The third group of congenital keratitis requires some explanation. These are not necessarily all of syphilitic origin; at the present time there are to the best of my knowledge 17 children at the Illinois School for the Blind as a result of syphilis. The fourth figure that of ophthalmia neonatorum which we know is of gonorrheal origin, is the most deplorable of all. These could all be prevented by the proper use of prophylactics in the eyes of new-born babies. The other groups need no comment.

The next slides show the causes of deafness. I have included the figures of Shambaugh and the Committee of the National Research Council for comparison. You will note variations in percentage in several diseases. However, the diseases causing the large prcentages are comparable.

## CAUSES OF ACQUIRED DEAFNESS

| Reported 1930 Shambaugh et al. | | | Illinois School for the Deaf, 1932 | |
|---|---|---|---|---|
| 19.0% | 385 | Meningitis | 55 | 15.62% |
| 8.54 | 172 | Measels | 21 | 6.96 |
| 6.90 | 139 | Scarlet fever | 21 | 6.96 |
| 6.90 | 139 | Influenza | 28 | 7.95 |
| 5.11 | 103 | Pneumonia | 9 | 2.55 |
| 4.31 | 87 | Suppurative otitis media | 11 | 3.12 |
| 3.51 | 81 | Whooping Cough | 10 | 2.84 |
| 3.47 | 70 | Fall | 0 | 0.0 |
| 2.93 | 59 | Infantile paralysis | 9 | 2.55 |
| 2.55 | 51 | Fever | 15 | 4.27 |
| 2.33 | 47 | Sup. otitis media and mastoiditis | 14 | 3.81 |
| 2.18 | 44 | Mixed infection | 0 | 0.0 |

*Read before Section on Medicine, Illinois State Medical Society, Springfield, May 17, 1932.

*Report of Epidemics of Influenza and Pneumonia at Illinois Schools for the Deaf and Blind.

| | | | | |
|---|---|---|---|---|
| 1.73 | 35 | Diphtheria | 5 | 1.42 |
| 1.59 | 32 | Typhoid fever | 2 | 0.56 |
| 1.49 | 30 | Skull fracture | 0 | 0.0 |
| 1.34 | 27 | Probable syphilis | 2 | 0.56 |
| 1.33 | 26 | Brain fever | (4) | |
| 1.09 | 22 | Mumps | 3 | 0.85 |
| .196 | 4 | Accidents | 17 | 4.82 |
| .882 | 18 | Spasms | 1 | 0.28 |
| .294 | 6 | Probable otosclerosis | 0 | 0.0 |
| .147 | 3 | Chicken pox | 0 | 0.0 |
| .147 | 3 | Fright | 1 | 0.28 |
| .147 | 3 | Colitis | 0 | 0.0 |
| .098 | 2 | Rickets | 0 | 0.0 |
| .049 | 1 | Sleeping sickness | 0 | 0.0 |
| .049 | 1 | Cholera infantum | 0 | 0.0 |
| .049 | 1 | Stroke lightning | 0 | 0.0 |
| .049 | 1 | Quinine | 0 | 0.0 |
| .049 | 1 | Burns | 0 | 0.0 |
| .049 | 1 | Tuberculosis | 0 | 0.0 |
| 22.10 | 420 | Unknown | 108 | 30.58 |
| | | Peritonitis | 1 | 0.28 |
| | | Convulsions | 3 | 0.85 |
| | | Poisoned | 1 | 0.28 |
| | | Brain abscess | 1 | 0.28 |
| | | Birth injury | 1 | 0.28 |
| | | Not deaf | 1 | 0.28 |
| | | Stomach trouble | 3 | 0.85 |
| | 2014 | Total | 352 | |

Some of these deserve brief explanatory remarks. You will note that meningitis heads the list. Shambaugh reports a somewhat higher percentage than was found in our group. This is explained perhaps by the larger number studied in his group. Also by the fact that our percentage are compiled from the cause given on the application of the pupil without any attempt at interpretation. However, the percentages are comparable and represent the greatest number in both groups. It was impossible to determine how many of these were associated with suppurative otitis media and mastoiditis. Only a very small percentage, however, show any evidences of previous middle air disease or mastoid involvement. (Perforated tympanic membrane or draining ears or mastoidectomy scars.) It is fair to assume that probably 90 to 95 per cent. are due to epidemic cerebrospinal meningitis caused by the meningococcus.

No attempt has been made in this paper to discuss the question of partial or total deafness. The results of audiometric studies are illuminating but time does not permit any discussion here.

The second largest cause of deafness in our series you will note in influenza. This differs from the report of Shambaugh. This is explained perhaps by the fact that more children are in attendance at the school now who had influenza during the large epidemics of 1918, 1919, 1920 and 1921 than were present when the previous study was made. Another point which may explain part of this difference is the popularity of the diagnosis of influenza since those epidemics.

Measles and scarlet fever leave a large number deaf. The study of deafness acquired as a result of these diseases is of great interest. Of all the diseases of childhood these two menace hearing most of all. Here, the relationship of suppurative otitis media, panotitis, and mastoiditis is greater. Many, in fact most of these children, show evidences of previous middle ear infection or mastoid disease. (Perforated drum with chronic otitis media and mastoidectomy scar.) The deafness in these, as well as all others due to infection of the middle and inner ear, is explained by most authorities as the result of a toxic meuritis of the auditory nerve.

Of all the other causes I will only discuss syphilis, and that only to point out the relative unimportance of that disease in the causes of deafness. However, this should be qualified by the statement that here, as elsewhere, a history of luetic infection of the parents is very difficult to obtain. The result of spinal fluid examinations would probably increase this percentage slightly. It would not, however, give it the importance attributed by many.

Before leaving the consideration of deafness and causes of deafness, I wish to call attention to the work of E. Glen Wever, Ph. D. et al. in the Psychological Laboratory at Princeton University, on the conduction of impulses through the 8th nerve. This work promises to bring to light many facts which may be of great help in the study of deafness.

| | | | |
|---|---|---|---|
| Influenza | 42 | Blow on head | 1 |
| Influenza with pneumonia | 11 | Compound dislocation of finger | 1 |
| Pneumonia | 1 | Sprained foot | 1 |
| Acute Tonsillitis | 7 | Ulcerated tooth | 1 |
| Acute colds | 157 | Cough | 1 |
| Otitis media | 7 | Injury to L. hand | 1 |
| Scabies | 30 | Paratoid inflammation | 2 |
| Observation | 35 | Fractured foot | 1 |
| Observation-tetany | 1 | Tongue laceration | 1 |
| Whooping cough | 1 | Poison ivy | 1 |
| Mumps | 1 | Malaria | 1 |
| Rheumatic fever | 1 | Sprained knee | 1 |
| Constipation | 25 | Acute tonsillitis, Follicular tonsillitis | 31 |
| Fractured leg | 1 | Acute phanyngitis | 14 |
| Rheumatism | 3 | Appendicitis | 3 |
| Pharyngitis | 7 | Dismenorrhea | 2 |
| Sprained knee and elbow | 2 | Pink eye | 3 |
| Lymphangitis | 1 | Indigestion | 2 |
| Boils | 2 | | |
| Sprained ankle | 2 | | |

| | | | |
|---|---|---|---|
| Injured shoulder | 1 | Dermatitis | 1 |
| Ringworm of body | 2 | Fractures: R. Tibia and fibula, | |
| Hysteria | 1 | Radius and Ulna, L. Pelvis | |
| Diphtheria antitoxin | 1 | and 2nd lumbar vertebra | 1 |
| Nausea | 1 | Acute tonsillitis | 3 |
| Injury to upper lip | 1 | Dislocation and fracture R. | |
| Vincent's sore throat | 1 | elbow | 1 |
| Blister on foot | 1 | | |

The last slide gives a partial list of the diseases treated in the Hospital at the School for the Deaf. You will note that tonsillitis, pharyngitis and acute colds head the list and make up the large percentage of the work. The majority of these children are not more than mildly sick. In fact, I venture to say that the great majority of them would not be put to bed nor under the care of a physician, if they were at home.

This brings me to a discussion of influenza and pneumonia. Benjamin Rush described "The Influenza" in 1789 in part as follows:

"The symptoms which ushered in the disease were generally a hoarseness, a sore throat, a sense of weariness, chills and a fever. After the disease was formed, it affected more or less the following parts of the body. Many complained of acute pains in the head. These pains were frequently fixed between the eye-balls, and, in three cases which came under my notice, they were terminated by abscesses in the frontal sinus, which discharged themselves through the nose. The pain in one of these cases, before the rupture of the abscess, was so exquisite that my patient informed me that he felt as if he should lose his reason. Many complained of a great itching in the eye-lids. In some, the eye-lids were swelled. In others, a copious effusion of water took place from the eyes; and in a few, there was a true ophthalmia. Many complained of great pains in one ear, and some of pains in both ears. In some these pains terminated in abscesses, which discharged for some days a bloody or purulent matter. In others, there was a swelling behind each ear, without a suppuration—sneezing was a universal symptom. In some, it occurred not less than fifty times a day. The matter discharged from the nose was so acrid as to inflame the nostrils and the upper lip, in such a manner as to bring on swellings, sores and scabs in many people. In some, the nose discharged drops, and in a few, streams of blood, to the amount in one case, of twenty ounces. In many cases it was so much obstructed, as to render breathing through it difficult. In some, there was a total defect of taste. In others, there was a bad taste in the mouth, which frequently continued through the whole course of the disease. In some, there was a want of appetite. In others, it was perfectly natural. Some complained of a soreness in their mouths, as if they had been inflamed by holding pepper in them. Some had swelled jaws, and many complained of the toothache. I saw only one case in which the disease produced a coma.

"Many were affected with pains in the breast and sides. A difficulty of breathing attended in some, and a cough was universal. Sometimes this cough alternated with a pain in the head. Sometimes it preceded this pain, and sometimes it followed it. It was at all times distressing. In some instances it resembled the chin-cough. One person expired in a fit of coughing, and many persons spat blood in consequence of its violence. I saw several patients in whom the disease affected the trachea chiefly, producing great difficulty of breathing, and, in one case, a suppression of the voice, and I heard of another in which the disease, by falling on the trachea, produced a cynanche trachealis. In most of the cases which terminated fatally, the patients died of pneumonia notha.

The stomach was sometimes affected by nausea and vomiting; but this was far from being a universal symptom."

Dr. Rush's description of the disease interested me and the quotation is only a part of the account. The irregularities of the initial symptoms still prevail. The great majority of the children who had the disease entered the hospital complaining of being "not well." They were not able to say just where they were "least well." They entered the hospital early in the disease. The usual admission temperature was not above 100°F. Those who ran a typical course of influenza were afebrile by the third or fourth day. In the epidemic of January of 1931 there were 200 at the School for the Deaf and 65 at the School for the Blind. The disease was very mild and there were only 6 who had anything that might be termed pneumonia. These were all at the School for the Deaf. This year, 1932, January, the epidemic assumed a more severe nature. While we had fewer patients they were all greatly prostrated. At the School for the Deaf we had 53 cases of influenza; of these 11 developed pneumonia. The critera on which the diagnosis of pneumonia was based were: elevation of temperature after the fourth day of the disease, leucocytosis. (This is a difficult finding to interpret because of the leucopenia which is associated with influenza) and postive chest findings, which did not as a rule become definite until about the seventh or eighth day of the disease. All but one of our cases terminated by crises. One had a pseudo crisis on the ninth day of the disease, and became very cyanotic. He was given oxygen for 16 hours, the cyanosis cleared up, his respirations became less

labored and his temperature returned to 104°F. He continued with the disease for two days, had a slow crisis over a period of 36 hours and recovered. One death occurred, this was in a poorly-developed poorly-nourished boy who had a very severe infection which apparently overwhelmed him from the beginning. He died on the fifth day of the disease. (A consultant described it as similar to the type of infection seen in the severe epidemics of 1918 and 1919.)

There were no cases of pneumonia at the School for the Blind.

This epidemic of influenza at the School for the Deaf with its high incidence of pneumonia is of interest. Why should there be such a high percentage of pneumonia? The patients were cared for in wards but as perfect isolation was maintained as was possible and all with pneumonia were screened. An explanation has been suggested, which seems reasonable. The deaf who do not talk are pecularly susceptible to pneumonia—this is apparently true though I have searched the literature for any references. It is reasonable to assume, however, that the lack of the increased expansion and aeration of the lungs in talking would give opportunity for bacterial multiplication and resulting disease.

In conclusion let me state:

1. That of all the diseases of childhood measles and scarlet fever leave more children deaf.

2. That the fourth largest cause of blindness, ophthalmia neonatorum, is entirely preventable.

3. That deaf children who do not talk are peculiary susceptible to pneumonia.

4. That I would make a plea that all of us who care for children respect and treat accordingly those diseases of childhood which result in defective hearing and vision.

## DISCUSSION

Dr. George E. Baxter, Chicago: Dr. Drennan should be congratulated upon bringing a study like this before us. In my experience it is the first time I ever heard of a study of the medical work done in one of these state institutions, and it certainly is very illuminating. It is quite different in many respects from that which we contact in private practice and in private hospital practice.

There are several rather important phases of this subject of influenza. We have not yet accomplished anything in a medical way to prevent epidemics of influenza. Not only have we not been able to prevent them, but we are not able to do anything specifically in curing them. This fact is the greatest challenge that the medical profession has today.

I say "influenza" in its very broad sense. We speak of colds, grippe colds, and all of these so-called upper respiratory infections that occur in children as grippe infections, influenzal infections, and so on, these are the conditions we are concerned with in general practice among children. We have a great deal to do with children who are affected with so-called upper respiratory tract infections and all of the complications and sequelae that come from them.

Personally, I had not the idea that measles was as productive of general deafness in children as Dr. Drennan has told us. I am quite certain that that varies a great deal in different epidemics. In the present epidemic that we are having in Chicago, I have seen more ears affected by an acute suppurative process than I have in any other epidemic of measles. This may happen to be just my personal experience, although other men with whom I have talked have had a similar experience. Our epidemics of measles or scarlet-fever naturally vary in different years, just as Dr. Drennan has said that the epidemics of influenza have varied in the last two years—last year very mild, this year quite severe and followed by pneumonias.

One might ask why did he not get pneumonias last year if the explanation which he gave is a correct explanation—that is, I understood him to say that there were not so many pneumonias last year as were present this year.

The thing that we observe is that these epidemics, not only of contagious diseases, but of acute upper respiratory tract diseases, vary tremendously with different years. We see one year, for example, a great many cases in which there will be ears involved in children. They will have suppurative otitis media. An other year we will have many of them that will have glandular infections following these upper respiratory grippal infections. Another year we will have tracheitis. It was very interesting to hear his quotation from Benjamin Rush when he said that some of these cases would lose their voices and some of them would have a tracheitis. We have had, for example, various epidemics with us where this aphonia laryngitis with stenosis of the larynx has been an extremely serious phase of the upper respiratory tract infection. They may have been complicated with a Streptococcus—perhaps they were—but these children developed a tremendous stenosis, making it difficult to differentiate them from a diphtheria. With some of them it is almost impossible to differentiate. That occurs, I think, more frequently in the younger children or the infants than it does in the older children.

Therefore, it seems to me in this whole subject that, in a medical way, we have not advanced very far beyond the descriptions which Dr. Rush gave so many years ago. We have not gone much farther in our clinical observations, not very much farther in our

prevention, and not very much farther in our treatment, with this exception; that I believe the importat thing in the care of any infant or child that has an influenza or pneumonia is to approach that treatment from the standpoint of the management of the child that is sick and not from the standpoint of the treatment of the disease. This method of care is based upon the fact that we have no specific remedy which will cure an influenza and no specific remedy which will cure a pneumonia. We can, as physicians, do a very great deal to protect these babies and children from being overtreated, from being overdrugged. Probably the one treatment that does more good than anything else is to provide physical rest for the infant or child that is sick. The idea of doing so many things for him decidedly interferes with the rest of the individual. Our medical men who treat pneumonias tell us that they now have learned to examine them, find out that they have a pneumonia, and then let them rest, omit the many unnecessary and disturbing things. We have to learn the same thing with our infants and children.

The next important thing is to give them plenty of water. I think that probably I will go down through my life talking about water, but water is the most important and specific remedy that we now have in treating babies and children. It is one which is denied to them all too frequently, for the simple reason that we wait for the infant or the child to ask for it.

Those two things are all that I would like to mention as far as the care is concerned. It is really a matter of care and management of the infant or child that is sick. When it comes to complications with an otitis media or a suppurative glandular infection, or what not, you have to apply some specific means or some specific mechanical treatment. Remember that the *care* of the sick *child* is the all-important thing. (Applause.)

Dr. George L. Drennan, Jacksonville: I will state in conclusion that the printing for the slides was done at the school for the deaf in the printing department.

I am very grateful to Dr. Baxter and Dr. Koehler for their discussions.

I think I can answer Dr. Baxter's question in regard to the influenza of 1931 by simply saying that it was about as mild as could be. If it had not been such a large epidemic I think that we would have called it nothing but cold. I agree with Dr. Baxter heartily on the treatment of children—treat the child and not the disease.

I believe the hardest thing for all of us to understand is that children do not stand dehydration, they cannot stand it; whereas an adult can go for thirty-six or forty-eight hours, perhaps, dehydrated, a child is just about 100 per cent. worse at the end of a twenty-four hour period without fluid. If children cannot take fluids by mouth, then give them some other way.

I appreciate Dr. Koehler's discussion in regard to the epidemiology of influenza. I did not make any attempt in the paper to discuss epidemiology. I realized that twenty minutes would have been gone long before I got started, but I agree with him that the isolation of those patients from carriers and from other children with the disease will prevent many complications.

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## SKULL FRACTURE IN CHILDREN WITH SPECIAL REFERENCE TO DEPRESSED FRACTURE AND CEREBRAL LACERATION

With Case Report

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It is the consensus of opinion among surgeons that children withstand head injury better than adults. Natural resiliency of the skull is responsible for freedom from severe crushing injuries. In very young children under the age of two years, the prognosis is not good since the venous sinuses situated inside the skull are liable to be lacerated. Should these cases not terminate fatally, spastic paralysis is to be expected.

Skull fracture may be conveniently divided into the following:

(a) Vault Fractures. This type is commonly seen in children. They are linear and have little tendency to extend into the base.

(b) Basalar Fractures are uncommon, and when seen, usually are the result of such severe trauma as to cause instant death; but, when they occur in the anterior fossa, as the result of injury to the forehead the prognosis is much more favorable.

(c) Depressed Fractures. We are chiefly concerned here with this type of fracture. They are due to direct violence and usually involve the vault of the cranium and may be closed, open, or penetrating and often comminuted.

It is possible for the outer table to be broken and depressed without injury to the inner. In children the inner table may be broken and the fragments separated, as a result of simple depression without fracture of the outer table. Usually both tables are involved, and when the force acts from without, the inner shows the greater damage. The theoretical rational for this is: the débris caused by injury to the outer table adds to the bulk of the penetrating body, and its wedge-like action still further increases the injury to the inner table.

Symptoms depend on the extent of injury inflicted on the brain and skull and are local and general. Locally when an external wound is present, blood or cerebrospinal fluid may be

seen escaping or brain tissue protruding. The depression may be seen or felt and comminution ascertained. A pond or saucer fracture results when the bone shelves evenly in all directions. When the depressed portion lies beneath the rest of the bone it is called a gutter fracture.

General symptoms depend upon whether the injury is a closed depressed or an open depressed fracture.

In the former the patient shows symptoms of concussion and compression, wheras in the open depressed type the immediate effects are less severe. The explanation for this is, that the blow has expanded itself in fracturing the cranium and hence does little harm to the brain substance.

When once the dura has been penetrated, inflammation is liable to spread to the meninges and a diffuse or localized suppurative meningitis will ensue. If there is not a free external opening allowing a ready exit to the discharge, retention of inflammatory products may lead to their diffusion and the symptoms of compression will soon become evident. Skull fracture in children may be accompanied by any one, or combinations of the following:—

1. Shock.
2. Concussion.
3. Irritation.
4. Compression.
5. Edema.
6. Laceration.

*Shock.* This is usually manifested by: loss of consciousness, rapid shallow respiration, rapid feeble pulse, low blood pressure, and cold clammy skin. The duration varies with the extent of injury. If the cerebral insult has been trivial, there is a rapid return to normaley.

*Cerebral Concussion.* This is a suspension of cerebral function as a result of head injury and the injury to cerebral substance varies according to the severity of the cause from punctiform ecchymosis to actual disintegration. Duret attributes the phenomena to stimulation of the restiform bodies in the medulla by sudden displacement of cerebrospinal fluid owing to a temporary driving inward of the skull by injury. The symptoms are variable: unconsciousness—partial or complete—is usually present. The pupils are equal and often contracted, rapid respiration, fluttering pulse, and relaxed sphincters are the rule. The duration is variable and terminates fatally or the patient reacts and may show phenomena of inflammation, compression or irritation. Usually restoration gradually becomes complete, reaction being fully established by the occurrence of vomiting due to cerebral hyperemia following the anemia.

*Cerebral Irritation.* A clinical condition characterized by great irritability of mind and body. It sometimes follows concussion and is usually due to a superficial laceration of the frontal region. The symptoms appear in two or three days after injury and include contracted pupils; weak, slow pulse; intense irritability. Usually at the end of a week a marked improvement is noted. Permanent sequlae such as chronic meningitis or mental aberration may result.

*Compression of Brain* is due to abnormal or excessive intracranial pressure which disturbs cerebral function and is characterized by: coma, sterterous respiration, pulse-slow at first—later rapid. Pupils vary according to the extent and location of the compression. Motor paralysis occurs late. Early, there may be a hemiplegia if the cerebral lesion is on one side. A localized compression of the motor area will lead to convulsions in the corresponding group of muscles.

*Cerebral Edema.* Soon after the accident considerable exudation follows causing the ecchymotic brain substance to swell and become edematous. This may subside, but in the more severe cases a spreading edema may result owing to pressure of the swollen tissues on the superficial veins in the pia mata. The circulation being thus hindered, increased exudation follows leading to general cerebral pressure and death. The excess of cerebrospinal fluid usually induced by the process hastens a fatal outcome.

*Cerebral Laceration.* The most constant sign which accompanies laceration is pyrexia and, should the motor area be involved muscular twitching will be present. It is impossible for the brain to be lacerated without resultant shock and concussion, hence, the symptoms of cerebral laceration become manifested after the signs of shock have passed. Pyrexia accompanied by signs of concussion postulates laceration since concussion per se is not associated with a temperature rise.

There are relatively few cases on record with an extensive crushing injury to the skull associated with marked depression and laceration of brain tissue, which have not terminated fa-

tally. The following case is that of a child who sustained a severe crushing injury to the head, with depression, laceration and virtual amputation of part of the cerebral surface by sharp, bony fragments:—

Case 1. J. D., aged four and one-half years, entered the hospital as an emergency case, with the history of having been struck in the head by an automobile.

*Physical examination* at the time revealed a child in deep coma, with a rapid, almost imperceptible, pulse and cold clammy skin. Inspection of the head revealed a compound, comminuted depressed fracture in the left frontal region, from which brain tissue was protruding, and considerable blood escaping. A single lateral film of the skull showed multiple depressed fractures of the left frontal bone. The child was more dead than alive, and immediate action was decided upon. The patient was taken to surgery and very little time was wasted in securing asepsis.

*Operation.* A semilunar skin flap about 3 inches in diameter was turned back together with the scalp muscles. A continuous mattress suture was placed along the margin of the skin flap to control hemorrhage before the incision was made. This exposed an area of 3 by 3 inches which showed both tables of the skull to be literally crushed and pressing inward. The multiple fracture fragments were gently removed with a dull bladed osteotome and bone forceps, together with an appreciable amount of lacerated dura and brain tissue which was found lying free at the site of fracture. When decompressed, the brain herniated outward, and brisk oozing from the cerebral surface was controlled by interrupted sutures in the torn dura. The wound was aseptisized and skin closed with a whip stitch without drainage. The operation required seven minutes and meanwhile subcutaneous saline was administered.

*Progress of Case.* The patient returned from surgery with improved color and a rapid but much stronger pulse. Improvement had been noted in these respects immediately the depressed bone was removed. She remained in coma for three weeks. At first, deep with sterterous respiration, elevated temperature and rapid pulse. Then gradually, day by day, she became a little better, somewhat closer to consciousness. She would take nourishment and seemingly eat reflexly when food was given her, thus maintaining good nutrition. When consciousness became reestablished, a physical examination was done and revealed the following:— The left eyeball deviated laterally; there was no choking of the discs; a pulsating bulging of the left frontal region was present at the site of decompression. The right arm was in clonic contraction and the right leg slightly less so. A lower seventh nerve paralysis was noted on the right side. Slight spasticity of the right lower extremity was present. The deep reflexes were increased and were livelier on the left than the right side. No Babinski, Kernig or Brudzinski, could be elicited.

*Mentality.* The mental progress was very interesting to observe; when consciousness was first regained the child neither talked (motor aphasia), nor seemed to comprehend questions or commands (sensory). This child was right handed, and an extension of the injury to the third frontal convolution, or area of Broca accounted for this manifestation. The fact that it was transitory seemed to indicate a pressure edema rather than actual tissue destruction. Paraphrasia constituted a prominent part of her speech as the signs of absolute motor aphasia began to recede. Constantly she would use the wrong word in sentences, very gradually this form of aphasia disappeared. Apraxia was very pronounced early in convalesence and has probably been the slowest pathologic finding to disappear. Voluntary movements of the right extremities, especially the upper, resulted in purposeless movements; partly accounted for by the marked spasticity present and the inevitable past-pointing associated with tonic muscular contraction. A very gradual improvement in the above mentioned aphasias, also in locomotion has been noted over a period of five months, and although it is impossible to prognosticate the outcome at this time, the outlook is at least hopeful and time alone will determine the end result.

Only one spinal puncture was done on this child and revealed clear fluid under slightly increased pressure. Her intracranial pressure was reduced by employing hypertonic saline and magnesium sulphate per rectum.

*Neurological Considerations.* Experimental evidence shows that the left frontal lobe may be removed (with the exception of the pre-rolandic and Broca's areas) without any after effect. The remote changes noted are due to the effects of pressure or edema upon distant parts of the brain. The pre-rolandic area of each frontal lobe is concerned with the cortical representation of motor power on the opposite side of the body. All of the motor centers are sharply limited posteriorly by the rolandic vein. The leg center lies alongside the falx, the arm center adjoins it and the face center continues still further laterally. Hemiplegia of spastic type with increased reflexes results from involvement of the pre-rolandic area. The order in which the motor centers are involved is important in localizing the lesion i.e. if leg center is first affected the lesion will be on the mesial side of the motor area. If the face is first affected the lesion will be primarily in the frontal, temporal or parietal lobe. In the above case the face center first showed signs of involvement.

*Aphasia.* A loss of or defect of speech is associated with injury to the left hemisphere in right handed individuals. A transient motor aphasia in this patient was noted. Some dis-

turbance of the subcortex of the left parietal lobe, whether by edema or otherwise, was manifested in this case by paraphrasia. Apraxia showed some involvement of the post-rolandic area of the left parietal lobe. Because of the prolonged unconsciousness of this patient it was feared that the center for consciousness might be involved. Experimentation has shown that the right cerebral hemisphere can be removed (peripheral to the corpus striatum) with no disturbance in consciousness; removal of left frontal, left occipital, and left temporal has no effect on consciousness. But, if the left anterior cerebral artery is injured, by any chance, the patient can never regain consciousness.

The center for consciousness, therefore, must be in the left cerebral hemisphere near the mesial aspect of the left hemisphere near the corpus callosum. Fortunately the injury did not involve this area.

*Conclusion.* 1. Children withstand head injury better than adults; in fracture, the linear variety is the rule.

2. Rapid, immediate decompression with adequate supportive treatment is the procedure of choice in depressed fractures.

3. Sufficient decrease in cerebrospinal fluid tension is obtained by dehydration methods in preference to lumbar puncture.

4. Loss of brain substance in the so-called silent area is entirely compatible with an ultimate good mentality.

5. Jacksonian epilepsy is the outlook in cases of this nature.

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## BRUCELLIASIS IN ANIMALS*

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Brucelliasis is an infectious, contagious disease of goats, cattle and swine, caused by Brucella genus; melitensis, abortus bovis and abortus suis. Poll-evil and fistulous withers in horses associated with localized Brucella infection as well as spontaneous infection in poultry have also been encountered. The epidemiologic significance of brucelliasis in poultry and horses is not known. Since Brucella infections in man may be traceable to infected goats, cattle or swine, the aim of the livestock sanitarian blends with the objective of the physician and public health officer in the suppression of the disease in animals. The hazard of undulant fever in man is thus reduced. Pursuant to this objective, a State Undulant Fever Committee has been appointed by the Director of the State Board of Health to study different aspects of Brucelliasis in animals and man. For the first time in Illinois all aspects of the disease will be considered under one correlating head.

In keeping with the objective of this committee, it may be mentioned that a survey of goat herds in Illinois has shown that these animals are free of the disease and that repeated annual tests on such herds should suffice against the introduction and spread of the malady. On the other hand, many cattle and swine herds are infected. Headed by officials of the State Department of Agriculture, veterinarians and livestock owners are voluntarily engaged in the control of the disease in cattle and swine, while state regulations require official tests on animals entering the state.

During the past ten years, field studies on the control of brucelliasis of cattle in Illinois have extended to 746 privately owned herds involving 19,487 cattle. These herds are located in 85 counties. As the result of repeated tests and sanitary measures voluntarily adopted by owners under veterinary supervision, more than 60 herds have been accredited as free from brucelliasis by the Chief Veterinarian of the State Department of Agriculture. Other factors being equal, Brucella-free herds

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should merit consideration from physicians and Boards of Health in pure milk campaigns. In the suppression of the disease in different herds in the State, approximately 100 veterinarians have been accredited to apply the preliminary agglutination tests. Accredited veterinarians have also been of assistance to physicians in applying the test for undulant fever.

The results of control measures in different herds may be summarized as follows:

1. Bang's disease in cattle and Traum's disease in swine are associated with bovine and porcine species of Brucella, respectively. These two species apparently do not commonly invade the unnatural host, yet reports of different investigators suggest that both types have been recognized in man suffering from undulant fever.

2. There are no gross lesions which condemn carcasses of reacting animals. Disposal of same to butchers is therefore practiced. The key to eradication programs in animals is therefore based largely on the detection of infected animals by the agglutination test, followed by quarantine, isolation and proper disposal.

3. The suppression of brucelliasis in cattle and swine in Illinois is dependent upon the desire of owners to have healthy, profitable herds. Compulsory testing is not the vogue at this stage, though some City Boards of Health require pasteurization or freedom from disease as established by test. Estimates indicate that brucelliasis in cattle and swine cost Illinois stockmen between five and six million dollars annually. Control is generally motivated by economics. Loss of calves and pigs, reduced milk flow, and sterility are the chief items of economy to the stockman.

## CLINICAL EXPERIENCES WITH TUBERCULIN

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Among the many problems challenging one in the field of diagnosis is that of the patient who, despite the appearance of average health, complains of a depression of mind, mental and physical inefficiency and a fatigue which is marked even after a full night's rest. When one has made a physical examination with negative findings and the laboratory examinations have been equally unproductive of helpful information too many of us are prone to dismiss such patients with the bromidic advice to "forget it" and mentally classify them as neurotics.

The writer was confronted with a group of nurses in the training school who complained of the above-mentioned symptoms and, in some instances, of inability to increase their weight despite a good appetite and hearty intake of food. Physical and laboratory examinations were of no positive service; some of this group showed a moderate degree of anemia, but no more than is found in large numbers of people with no symptoms.

It occurred to the writer that one universal and ancient infection—tuberculosis—might afford a reason for this syndrome. Chest plates were made and showed only the old hilus glands and calcified lymph-nodes which the roentgenologists now include in "normal chests." This group was then asked to make a record of their temperature at least four times daily for two or three days and all but two showed no variation from normal; the exceptions showed a peak to 99.5 in the afternoon.

Following this observation each girl was given subcutaneously ten minims of a 1:100 dilution of Koch's old tuberculin. In every case there was a definite response consisting of a local reaction varying from three to twelve c.m. in largest diameter, with heat, redness and induration; some had a chill; all had elevation of temperature up to 100 or 102, and malaise and aching which lasted from 24 to 48 hours.

One week after this test therapeutic use of tuberculin was started, the initial dose being 2 minims of old tuberculin, 1:1000 dilution. Each week this was increased by two or more minims according to the occurrence of a reaction, and all of these doses were given subcutaneously. When the dose reached ten minims, the next serial dilution, 1:100 and 1:10 respectively were used until the final dose was 5 minims of the 1:10 dilution. When this dose is reached there is usually no reaction except a moderate local much smaller, if present, than that obtained by the original test dose.

Because of our universal infection in childhood it occurred to the writer that perhaps he

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was being misled by these experiences and that all of us might give a similar response to tuberculin. Volunteers from the nursing group who had no symptoms and were apparently in the best of health and efficiency were sought to permit the use of the same testing as was used in the group just described. Six nurses responded and again there was no temperature prior to the test, and x-ray plates of the chest showed the same changes as had been observed in the first group. Interestingly, after the injection of the same amount of tuberculin, there was no reaction of any kind.

Twenty-five patients have been thus treated and uniformly there has been a complete change in the picture. Instead of finding it difficult to carry on the day's work, all of these patients have been able to meet all demands without undue fatigue and with increased efficiency and joy in their tasks.

The only deduction which seems tenable to the writer is that these individuals were allergic to tuberculoprotein and the method of treatment used was that of desensitization as is commonly practiced for other allergic substances. The literature on allergy abounds with reports of all kinds of hypersensitiveness to protein,—food, epidermal, pollen, etc.,—but little or no reference is made to this most common possibility.

The preparation and use of tuberculin is as follows: Koch's old tuberculin is obtained in 1 C.C. vials and one part of this with 9 parts of normal salt solution, to which phenol, 0.5 per cent is added as a preservative, makes the first decimal dilution, or a 1/10 strength. Again, one part of this dilution added to 9 parts of diluent makes a 1/100th solution; and one part of this dilution added to 9 parts of diluent makes the 1/1000 solution. This method can be carried out to whatever dilution one may desire. These are all prepared with strict regards for asepsis and the dilutions kept in a refrigerator, since they thus appear to keep potent for an indefinite time. If refrigeration is not available fresh dilutions of the 1:100 and higher should be made at least once monthly.

In using tuberculin therapeutically much judgment is demanded, since this agent is potent and capable of doing harm. The initial therapeutic dose may safely be one or two minims of the 1:1000 dilution injected subcutaneously, and at weekly intervals (although four or five day intervals are used by some) the following doses are administered. If there has been no marked local reaction the dose may be increased by 25 to 50 per cent of the preceding one. Experience has taught that where there is a large local reaction and especially if there is much constitutional response (temperature, aching, malaise, etc.) the dose usually should not be increased. The writer has found that merely repeating the same dose after such response causes only a moderate reaction. It sometimes has been found advisable to repeat the same amount several times before increasing the dose.

The following case reports illustrate the writer's experiences with tuberculin.

Case 1. Miss E. D., aged 24 years, nurse, was first seen November 18, 1930, two weeks after having had the mumps, because of weakness, afternoon temperature (99-102) and enlargement and tenderness of the submaxillary glands. She was 67 inches tall and weighed 135 pounds. Physically there were no abnormalities found except the adenitis mentioned. She was not seen again until February 2, 1931, still being easily fatigued and conscious of the glandular tenderness. Blood count was: Hb, 80; reds, 4,910,000, leukocytes 17,400, with neutrophiles 68% and lymphocytes 28%. X-ray of the chest revealed only ancient hilus thickening and calcified lymph-nodes. General physical examination was negative for abnormalities. A daily 4-hour temperature for three days showed the maximum to be 99. On February 9, ten minims of the 1:100 dilution of old tuberculin was given subcutaneously. In the following 24 hours the temperature rose to 103, with marked aching and malaise, and at the site of the injection a hard, red, hot reaction appeared 6x7 cm. in area. Therapeutic use of tuberculin was begun on February 21 with one minim of the 1:1000 dilution of old tuberculin. (O.T.)

February 28, OT, 1/1000, M 1.

March 10, OT, 1/1000, M 2. No reaction. Glands smaller.

March 17, OT, 1/1000, M 2. No reaction. Feels much stronger.

March 27, OT, 1/1000, M 4. No reaction.

April 3, OT, 1/1000, M 6. T. 100. Aching, on the 4th, with a temperature of 101.8 on the 5th. Menstruation on this date.

April 10, OT, 1/1000, M 6. No reaction.

April 20, OT, 1/1000, M 8. Slight reaction in glands, aching, no temperature. Feels very well.

April 28, OT, 1/1000, M 10. Local reaction. 7 cm. T 100.

May 7, OT, 1/1000, M 10. Temperature to 99. Small local.

May 13, OT, 1/100, M 2. Only slight local reaction.

May 26, OT, 1/100, M 3. Temperature to 99.3. aching and malaise.

June 4, OT, 1/100, M 4. Marked malaise 24 hrs. T. 99.2. Glands tender, very little enlarged.

June 11, OT, 1/100, M 6. Reaction about same.

June 18, OT, 1/100, M 7. Chill. Temp. to 101. Weight 138 lbs.

June 24, OT, 1/100, M 10. Little reaction.

July 2, OT, 1/10, M 2. Small local. T. 99.6. Menstruation.

July 9, OT, 1/10, M 5. Sharp reaction 48 hrs. Chill, nausea, T. 101.6. Glands tender.

July 16, OT, 1/10, M 3. Feels unusually well. Weight 140 lbs. Negligible reaction.

*Comment.* The fact that the tuberculin caused a definite focal reaction in the submaxillary glands which were first noticed coincident with an attack of mumps, leads one to surmise that the latter infection activated a latent tuberculous adenitis. Certainly a mixed infection is suggested by the leukocyte count greater than one usually observes in an unmixed tuberculous infection. Her response to tuberculin both locally, focally and constitutionally after the test dose, with occasional focal reactions during desensitization, and the final marked improvement in health support the belief that this agent has a definite field of use in medicine.

Case 2. Mrs. R. H. R., aged 38 years, stenographer, widow. This patient had been observed from time to time since November, 1923, for conditions which will be cited in her past history. She was seen in March, 1930, for an acute rhinitis, and not again until Sept. 19, 1931, when she complained of having been unduly tired all summer, despite plenty of sleep and a vacation. She reported also a loss in weight of about ten pounds in the past six months and was very blue and depressed. Her past history included measles, pertussis, occasional "colds," puberty established at 18. Had a miscarriage at four weeks, date not given; otherwise never pregnant. Had a right cystic ovary and the appendix removed in 1918. That Fall had a severe influenza. Between 1923 and September, 1930, she had had treatments with ovarian extract because of diminishing menstruation and on the basis of a lessened function relative to the ovariectomy in 1918.

Physical examination revealed no basis for the picture presented, and because of an increasing experience with the value to be derived in such conditions from the use of tuberculin a test dose of this agent, ten minims of a 1:100 dilution, was given after checking the temperatures. The reactions consisted of chill, aching, a temperature rise to 100.3 and a primary local reaction of 3x4 cm. surrounded by a secondary aureola of 7x9 cm., with marked edema. One week later there still remained marked induration at the site of injection. On September 26, 1931, her weight was 118 pounds (height 5 ft. 5 in.) and therapeutic tuberculin, dilution 1:1000 was begun with a dose of two minims. These doses were increased weekly by one minim and her report on Dec. 5, 1931, was that she felt much stronger, tired only moderately and her weight was 123 pounds. On this date six minims were given, a fairly large local reaction without temperature rise resulted, and the next dose was not increased. By January 16, 1932, the dose had reached ten minims of the 1:1000 dilution and only a small local reaction, 3 cm. in size, resulted. She reported as feeling very well and efficient and free of the depression which had been so marked. Her progress was uneventful and on April 26 the final dose of five minims of the 1:10 dilution was given without reaction. She weighed 127 pounds and stated that she could not recall when she had felt so well and full of energy and endurance. A total of twenty-six doses was administered in this instance.

*Comment.* A patient with unexplainable fatigue and inability to gain weight, whose study failed to disclose demonstrable pathology, manifested a marked reaction to tuberculin. By gradually increasing doses she became "desensitized" and showed a notable gain in weight and efficiency and a loss of symptoms. That she was allergic to tuberculin cannot be questioned, and the logical conclusions is that her symptoms were manifestations of this allergic state.

Case 3. Miss E. M., aged 25 years, teacher. In July, 1931, this patient complained of underweight of long duration and a constant fatigue which had been present for nearly a year. Her past history included pertussis, measles and at a time not dated, of glandular swelling (adenitis). Puberty was established at 16, with an interval of about five weeks between periods; these, for the past five years had been painful but not sufficiently so as to incapacitate her. Her family history was irrelevant. Examination revealed an alert, attractive girl of 62 inches in height weighing 93 pounds. The chest revealed no abnormalities, the heart was normal. There was no ptosis to account for the persistent underweight, nor was any visceral change discoverable. X-ray of the chest showed only calcified glands and hilus shadows accepted as normal. Tonsils, teeth and thyroid were apparently normal. On August 6, 1931, after a three days' observation of the temperature which showed no rise above normal, a test dose of old tuberculin, ten minims of the 1:100 dilution was given. The reaction within 24 hours was almost violent; at the site of the injection a hot, red, indurated area 7x9 cm. was observed, accompanied by a rise in temperature to 101.2 and severe aching and malaise. Her vacation being due, treatment was deferred until her return and was as follows:

September 12, 1931, OT, 1/1000, M 1.

September 19, OT, 1/1000, M 4. Local reaction 3x5 cm.

September 26, OT, 1/1000, M 6. Feels stronger.

October 3, OT, 1/1000, M 10. No reaction.

October 10, OT, 1/100, M 2. Hard at work. Feels no undue fatigue.

October 17, OT, 1/100, M 4. Small reaction.

October 24, OT, 1/100, M 6. Unusually heavy week. Local 6x8 cm. No temperature. Little fatigue.

October 31, OT, 1/100, M 6. Heavy week. Feels "bully."

November 7, OT, 1/100, M 8. Weight 98. Feels unusually vigorous. No reaction.

November 14, OT, 1/100, M 10. Reaction 4x6 cm. No general.

November 21, OT, 1/100, M 10. Local reaction 5x7 cm. Chill. Temp. 101. Aching for two days. Feels fine now.

November 27, OT, 1/100, M 5. Reaction smaller, lasting only 24 hours. Feels very fine though working hard.

December 5, OT, 1/100, M 5. Local reaction 10 cm. Temp. 99.4, but no aching.

December 12, OT, 1/100, M 5. Local as before. Tired from a very hard week. No temperature.

December 19, OT, 1/100, M 3. Local reaction 4x4 cm. Feels fine.

December 26, OT, 1/100, M 4. Reaction as before.

January 2, 1932, OT, 1/100, M 4. No reaction. Heavy week.

January 9, OT, 1/100, M 6. Only slight local. Feels very well.

January 16, OT, 1/100, M 8. Local reaction 4x6 cm. for 48 hours.

January 23, OT, 1/100, M 9. Very small local reaction.

January 30, OT, 1/100, M 10. Small local reaction.

February 6, OT, 1/100, M 12. No reaction. Weight 98 pounds.

February 13, OT, 1/10, M 2. No reaction.

On June 21, 1932, her weight was 97 lbs. A very strenuous winter's work was carried efficiently and without undue fatigue.

*Comment.* The history of a probable early tuberculous adenitis, together with x-ray evidence of a quiescent childhood pulmonary invasion leads to the reasonable deduction that there was a long-lasting tuberculoprotein hypersensitiveness affecting in some unknown manner this patient's metabolism and causing the underweight and undue fatigue. The violent tuberculin reaction which gradually disappeared on increasing dosage together with restoration of endurance and efficiency, despite a strenuous program during the period of treatment makes the hypothesis of this being entirely an allergic phenomenon very tenable.

Case 4. Miss Z. McG., aged 33 years, nurse in training. Height 5 ft. 7 in. For some months had been unduly fatigued and unable to bring her weight up to normal for her height and age. Weighed 123 lbs. Past history was irrelevant, except for a mild attack of influenza several weeks prior to this study. Blood count showed only a moderate degree of anemia. The x-ray of the chest showed only those changes accepted as within normal and physical examination revealed no cause for her condition. A tuberculin test, ten minims of the 1:100 dilution, on March 3, 1931, gave a local reaction of 5x6 cm. in area, and a temperature rise to 101, with aching and malaise lasting two days. Treatment with tuberculin was as follows:

March 10, 1931, OT, 1/1000, M 1.

March 17, OT, 1/1000, M 2.

March 27, OT, 1/1000, M 4. No reaction.

April 4, OT, 1/1000, M 6. Small local reaction. Feels much better.

April 10, OT, 1/1000, M 6.

April 18, OT, 1/1000, M 7. Reaction small. Steady improvement.

April 25, OT, 1/1000, M 10. Reaction small. Steady improvement.

May 2, OT, 1/100, M 2. Reaction small. Steady improvement.

May 9, OT, 1/100, M 4. Reaction small. Steady improvement.

May 16, OT, 1/100, M 6. Feels very efficient. Weight 130 lbs.

May 25, OT, 1/100, M 8. Only small local reaction.

June 1, OT, 1/100, M 10. Only small local reaction.

June 8, OT, 1/10, M 3. No reaction.

June 15, OT, 1/10, M 5. No reaction. Weight 135 lbs. Feels better than for several years.

This nurse, on June 21, 1932, reports that the past year she has maintained a fine level of health and efficiency, even though while in another hospital she had an attack of pertussis. Her weight at present is 135 pounds.

*Comment.* It is possible that the influenza preceding the writer's contact with this patient, may have incited a reactivation of tuberculosis, the evidences being too slight to be found by physical examination or the x-rays. However, the end result justified the use of tuberculin.

Case 5. Miss G. H., aged 36 years, accountant. The history covers over four years in that the patient complained of fatigue, susceptibility to colds and cough at the time of her first visit in March, 1928. Her past history included measles, scarlet fever, otitis media and mastoiditis. Tonsils were clipped at the age of 12 and her appendix was removed at 13; and she had had influenza several years prior to her visit.

In the family history the important notation was that an older sister had died from tuberculosis in January of this year. Father and mother are living and averagely well. The patient was 66½ inches tall and weighed 106 pounds, having lost about five pounds in the last year. The relevant findings were ragged, submerged tonsils without adenopathy; slight dullness over the upper lobe of the right lung with increased vocal resonance but no moisture. The lungs were otherwise mobile and resonant. Temperature was 99 (P.M.) The heart was small and vertical in type, consonant with a long ptotic thorax. Employment of a Seidlitz powder disclosed the greater curvature of the stomach to lie five fingers-breadth below the umbilicus. X-ray of the chest revealed no active process. With increased

diet and a properly fitted corset she gained in strength and general efficiency, her weight reaching 118 pounds by November, 1928. She was seen once in 1929 and again in June, 1930, when she complained of lassitude and a loss in weight to 111 pounds. Again examination of the chest revealed no changes. In December, 1930, her weight was 114 lbs. and her condition was essentially unchanged. Another chest plate revealed no changes from that made in 1928. A polyvalent respiratory vaccine was used and there was considerable reaction following each dose, consisting of temperature varying between 99.5 and 101. With some improvement in strength and a gain in weight to 116 pounds. Without making a tuberculin test small doses of this agent were used beginning with minims four of the 1:10,000 dilution. Weekly doses were administered and gradually increased. In February, 1931, the doses were from the 1:1000 dilution and her weight had gone to 121 pounds, with a gratifying increase in strength and comfort. There was little reaction from its use, chiefly local. Throughout March and April there was continuing progress, the doses now being in the 1:100 dilution without other than local reactions. Her last dose on June 20, 1931, was five minims of the 1:10 dilution, from which there was no reaction. She weighed 131 pounds and felt better than for years. At present, June, 1932, this condition of health and efficiency, though she has been under increasing responsibilities, has been maintained.

*Comment.* The close contact with an open and fatal case of tuberculosis offered large possibilities of reactivation in this patient, and though all efforts to discover such activity were futile, her marked reaction to foreign protein which seems commonly to be ill-borne by those with active tuberculosis, warrants such suspicions. Her fine response to therapeutic tuberculin supports the writer's belief that this agent is of great value in such conditions as were present here, whether due to tuberculous activity or simply an allergic state.

Case 6. Miss J. S., aged 28 years, was seen Feb. 2, 1932. A well-educated ambitious young writer; she had lost all interest in her work for the past eight months because of a physical and mental fatigue, marked even after a full night's rest. Her past history was meager; she had an upper respiratory infection about once annually. She had been recently treated for dysmenorrhea by a gynecologist who dilated and inserted a pessary. She sleeps poorly, awakening about two or three A.M., finally to fall asleep, arising whenever she awakes, but fatigued. The appetite is good, but her weight is 114 pounds and she has been unable to increase it. Bowels move regularly and freely. Examination of heart, lungs and abdomen revealed no evidence of abnormality. Blood count: Hb. 70%; reds, 4,100,000; leukocytes, 8000, of which there were neutrophiles, 65%, lymphocytes, 34%. A chest plate was not made because of the expense. On Feb. 4, 1932, ten minims of the 1:100 dilution of old tuberculin was given subcutaneously, followed by a chill, temperature to 100.3 with much aching and malaise and a local reaction of 6 cm. in area. Therapeutic treatment was as follows:

February 11, OT, 1/1000, M 2. No reaction.

February 20, OT, 1/1000, M 3. No reaction. Feels much better.

February 27, OT, 1/1000, M 5. Small reaction. Stronger, working.

March 5, OT, 1/1000, M 7. Local reaction 6 cm., chilly, with a temperature for one day to 101.4; since then has felt better than usual.

March 12, OT, 1/1000, M 6. No reaction.

March 19, OT, 1/1000, M 7. Local reaction of 5 cm.

March 26, OT, 1/1000, M 8. Small local reaction. Feels very well.

April 2, OT, 1/1000, M 11. Moderate local reaction; no general.

April 9, OT, 1/100, M 2. No reaction.

April 16, OT, 1/100, M 4. Moderate local reaction.

April 22, OT, 1/100, M 6. Local reaction 2.5 cm.

April 29, OT, 1/100, M 10. Insignificant local reaction. Feels "bully."

May 6, OT, 1/10, M 5. Local reaction 6 cm; temperate to 100 of 24 hours duration.

June 3, 1932. Feels able to meet any situation and has gained weight to 119 pounds.

*Comment.* This patient showed the most rapid and remarkable restoration to a buoyant state of health of any of the patients in this group. The gynecologist referred to above recently stated that this patient's mental and physical depression was such that she gave a rather grave prognosis to the family and was astonished at the end result obtained.

Case 7. Mrs. M. E. W., aged 62 years, practical nurse. This patient consulted the writer Sept. 28, 1931, because of an undue fatigue for the past three or four months, and because opacities were found in the vitreous of the left eye, such as might be accounted for by an old, latent tuberculosis.

Her past history included some infected teeth which had been removed, a mild chronic arthritis, occasional "colds," a mild influenza, arteriosclerosis without hypertension and resulting coronary sclerosis with myocardial changes of moderate degree. The blood pressure has varied between 130-150 systolic, over 80-90 diastolic. Her weight for the past year has averaged 140 pounds. Physical examination revealed no explanation for the fatigue and on October 1, 1931, after observing her temperature every two hours for two days, with no elevation present, ten minims of old tuberculin, 1:100 dilution was given. In the next 24 hours the temperature rose to 101.3, there was marked malaise, aching and a local reaction 7x12 cm. Because the reaction was prolonged for five days, treatment was started on October 12, with two minims of the 1:1000 dilution. She was very regular in her visits and the doses were progressively increased, her final dose being five minims of the 1:10 dilution on February 16, 1932. Her improvement in fatigue was first noticed after the

fifth dose given on Nov. 10, 1931. Her reactions were usually moderate and insignificant, consisting usually of a temperature rise to 99.2-99.6. However, on December 1, the dose had reached 8 minims of the 1:1000 and this was followed by a temperature to 100.8 and much aching and malaise with a large local reaction. When the doses rose to the 1:100 dilution the reactions were much less, being only local and small. On February 16 when the patient was dismissed there had been a complete restoration of efficiency which is still present in July, 1932.

*Comment.* **While one may assume that the degenerative changes compatible with this patient's age might account for her marked fatigue, the rapid disappearance of this symptom and maintenance of improvement places this case in the group of allergic patients reacting sharply to the test and improving after desensitization.**

Case 8. Miss E. H., aged 40 years, graduate nurse of 15 years professional activity. Her complaints at the time of her first consultation March 23, 1931, were fatigue, heart pain on exertion and acne rosacea. The fatigue had been so marked for several years that often she had been compelled to give up her work and rest. After nursing in Honolulu several years prior to 1931, she suffered much as at present and was sent back to the States on the basis of climatic factors. Her past history was meager. An influenza in 1926 was followed by cystitis, later "grippe," double quinsy and pleurisy. Her heart symptoms appeared after the quinsy. The tonsils were removed in 1927. The family history was not significant. Physical examination noted the acne rosacea on cheeks, nothing of significance in the lungs, heart slightly enlarged to the left with normal rhythm and normal distant tones. The abdomen was unrevealing. Her basal metabolic rate was minus 11.7%. ECG indicated myocardial fibrosis. Her weight was 148. Blood pressure varied between 116-122 systolic; over 80-90 diastolic. Because of the acne which militated against her professionally foreign protein lactigen was used for a number of doses, which caused definite improvement in the rosacea. However, the distressing fatigue continued and produced a mental depression which was marked. After checking the temperature for two days finding it to be persistently subnormal, the usual dose of ten minims of the 1:100 dilution was given, on May 13. A local reaction of about 8 cm. in area, with elevation of temperature to 100, and severe aching and malaise followed. On May 23, therapeutic use of tuberculin was begun with minims 2 of the 1:1000 dilution. Curiously, she felt better a week after the test dose and steadily gained in comfort and efficiency throughout the course of injections. No reactions were more than moderate, temperature elevation only once reaching 99.6. Her final dose given August 10, 1931, produced essentially no reaction. Because of the lack of work she was compelled to leave the city, but a report from her later evidenced the real improvement.

*Comment.* **This nurse, whose undue fatigue often caused her to give up a case, gave no findings explaining the condition. Her temperature reaction was notable, since the rise was against a constant subnormal reading. The improvement gained by the use of tuberculin was surprising, even to the patient herself.**

Case 9. H. T. R., aged 37 years, salesman. Was in apparently good health up to May 30, 1930, when, during a golf game, was seized with marked pain and swelling in the right wrist. A physician who saw him at that time made a diagnosis of acute arthritis and instituted treatment with intravenous injections of mercurochrome and later with salicylates. Later intramuscular injections of yatrin-casein were given. Five teeth were also extracted. When seen by the writer, Nov. 17, 1930, he stated that since May 30 he had lost thirty pounds in weight and had developed much pain and moderate swelling in both wrists and ankles and was having a daily afternoon rise of temperature to 101. His past history embraced pertussis, sore throats, a right maxillary sinusitis in 1929; appendectomy in 1914; right foot fracture in 1928, followed by a phlebitis. The family history was not significant. The essential physical findings were: Weight 126 lbs. Height 67 inches. Tonsils small, slightly injected, but not considered as needing removal when examined by a member of the Nose and Throat department. There was a debatable cervical adenopathy. The lungs revealed no changes on inspection, percussion and auscultation. The heart also revealed no abnormalities. The wrists and ankles showed moderate swelling, but with no redness or heat; tenderness was marked and movement induced pain. Progress notes on the hospital record under date of Nov. 17 are as follows: "This appears to be a case of multiple arthritis of infectious origin. The loss of 30 pounds in weight in six months with a daily rise of temperature to 100.5 suggest other possibilities."

Laboratory findings were: Wassermann, negative; Kahn negative. Blood count: Hb, 85%. Reds varied in three counts from 4,610,000 to 5,100,000. Whites 3 counts, 20,500; 18,000, 13,600. Neutrophiles 68% and 75%; lymphococytes 28% and 18%; trans. 4%. Eosinophiles, 7%. Urine showed faint trace of albumin, and 2-3 hyaline casts. Cultures of blood, urine, feces, prostatic strippings and washings from the right antrum were negative. X-ray of the joints involved showed no definite arthritic changes but a curious rarefaction of the os magnum, cuneiform, pisiform, radius and tip of the ulnar styloid process. A chest plate on the 17th showed "haziness of the right apex, upper and middle lobes, infiltration of the right hilus, bronchial infiltration and coarse fibrous strands across the middle lobe from the hilus to the outer costal margin. The parenchyma is studded with calcifications at the terminal bronchial endings indicative of repeated pulmonary inflammatory pathology." Ray of the sinuses revealed only haziness of the right antrum suggesting thickening of the mucosa.

Inquiry about the onset of this May attack elicited the

tact that just preceding his arthritic onset he had had a "cold" with pain in the right chest between the sternum and the breast with much cough and moderate production. He cannot recall if he had temperature, but did have night sweats. His temperature ranged from 98 in the morning to 99.8 in the evening on the 17th and 18th. On the 18th, ten minims of old tuberculin, 1:100 dilution, was given about noon. At 8 P. M. on the 19th his temperature rose to 102.2 accompanied by a local reaction 5x8 cm. in area, from which streaks of lymphangitis led to the axilla. The axillary glands were enlarged and tender.

A diagnosis of tuberculous polyarthritis was made, though no such clinical entity seemed to have been established. Just at this time there was found in the Journal, A. M. A., of Sept. 5, 1930, an extract from the *Muenchener Medicinische Wochenschrift* to the effect that Reitter and Lowenstein reported 9 cases of polyarthritis in which they had isolated from the blood demonstrable tubercle bacilli. Confirmation of the reasonableness of the diagnosis was strengthened by a second chest plate taken Dec. 26, 1930, which showed the presence of a small amount of fluid in the right base, presumably due to a tuberculous pleuritis. Tuberculin therapy was started with doses of the 1:100,000 dilution of old tuberculin. He was very sensitive to this agent and sharp reactions were obtained both in temperature, aching and increase of joint pains, which, however, subsided gradually to an increased degree of comfort.

The patient went to Arizona in March, 1931, taking his plates and a synopsis of his case. A letter from his physician there states: "The complement fixation test for tuberculosis gave a two plus positive reaction," and "I am unable to detect any sign of activity in his chest, and yet he is running a rather typical temperature. I have not yet brought myself to agree with your diagnosis, but I am very willing to be convinced." "Mr. R— has lost weight since coming here and I am quite concerned about him."

The patient returned to Chicago in June, 1931, and was seen casually. He stated that his tonsils had been removed, but that he still had arthritis. Seen again in June, 1932, it was apparent that there had been no real gain in his condition and presumably he is having no treatment of any kind.

*Comment.* It seems reasonable that the "cold" just preceding the arthritis reactivated an old tuberculosis and that tubercle bacilli were deposited in the soft tissues about the joints via the blood stream. The temperature rise daily, his high sensitivity to tuberculin, the discrepancy between the joint symptoms presented and those usually seen in the usual type of arthritis together with failure of salicylates to ameliorate them, and finally the demonstration of fluid in the right chest,—all these fit logically into the diagnosis of tuberculous polyarthritis.

*Summary.* A report on the use of tuberculin in a group of 25 cases, all of whom, with one exception (H. T. R.) complained of a distressing fatigue, for which no gross evidence was found.

Each of these gave a marked reaction to tuberculin manifested by a rise in temperature, aching, malaise and a local reaction varying in size from 3 to 12 cm.

These patients, all treated with gradually increasing doses of tuberculin, lost this fatigue, gained endurance and efficiency and usually an increase in weight where this had been below normal.

This experience gives rise to the question of these symptoms being an expression of a tuberculoprotein allergy, and suggests the wider use of this agent in this otherwise discouraged and discouraging type of patients.

Intelligence and caution are demanded in the use of tuberculin, and especially is a thoughtful individualization necessary.

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## THE EFFECT OF TYPHOID VACCINE ON THE ERYTHROCYTE COUNT IN DEMENTIA PARALYTICA

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and
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A study of the erythrocyte counts of patients at the Kankakee State Hospital afflicted with dementia paralytica has revealed the fact that these individuals have a tendency towards a low erythrocyte count in those cases in which fever therapy did not constitute a part of the treatment. This low count appears to be independent of the amount of antiluetic treatment given.

A perusal of the literature on the use of typhoid vaccine in the treatment of general paralysis has disclosed no mention of any changes occurring in the erythrocyte counts during and after treatments and this prompted the present study.

The work was started in July, 1931, and has been continued up to the present time. During this period over 1,800 typhoid vaccine injections have been given to 64 male patients. In connection with these, 172 erythrocyte counts have been made as a basis for this report.

It was observed that the administration of

typhoid vaccine *improved the general health* of patients so treated.

*Method.* The injections of typhoid vaccine were given twice a week until 16-18 injections had been given. This constituted a series of typhoid injections. Regardless of previous treatment each patient received an initial dose of 50 million dead typhoid bacteria. Subsequent injections were increased dependent upon the response to previous injections. The dosage was never greater than 2.5 billion. When this maximum dosage had been reached a good response was obtained not by further increasing the dosage but by reducing it to the size of the initial dosage. In such cases subsequent dosages were again gradually increased.

This report includes only the consideration of those patients on whom erythrocyte counts were made just before and after typhoid vaccine courses.

A brief tabulation of the results is as follows:

Group 1. Those patients who have reports complete on one series of typhoid injections.

| | | |
|---|---|---|
| Case 1. | Increase of erythrocytes | 340,000 |
| Case 2. | Increase of erythrocytes | 520,000 |
| Case 3. | Increase of erythrocytes | 640,000 |
| Case 4. | Decrease of erythrocytes | 400,000 |
| Case 5. | Increase of erythrocytes | 700,000 |
| Case 6. | Increase of erythrocytes | 200,000 |
| Case 7. | Decrease of erythrocytes | 710,000 |
| Case 8. | Increase of erythrocytes | 250,000 |
| Case 9. | Increase of erythrocytes | 1,090,000 |
| Case 10. | Increase of erythrocytes | 600,000 |
| Case 11. | Increase of erythrocytes | 530,000 |

Group 2. Those patients who have reports complete for two series of typhoid injections.

| | | |
|---|---|---|
| Case 1. | First series —decrease of erythrocytes | 748,000 |
| | Second series—decrease of erythrocytes | 500,000 |
| Case 2. | First series —increase of erythrocytes | 470,000 |
| | Second series—increase of erythrocytes | 90,000 |
| Case 3. | First series —increase of erythrocytes | 220,000 |
| | Second series—increase of erythrocytes | 180,000 |
| Case 4. | First series —decrease of erythrocytes | 1,000,000 |
| | Second series—increase of erythrocytes | 100,000 |
| Case 5. | First series —decrease of erythrocytes | 1,000,000 |
| | Second series—decrease of erythrocytes | 150,000 |
| Case 6. | First series —decrease of erythrocytes | 440,000 |
| | Second series—increase of erythrocytes | 320,000 |
| Case 7. | First series —increase of erythrocytes | 240,000 |
| | Second series—decrease of erythrocytes | 120,000 |
| Case 8. | First series —increase of erythrocytes | 810,000 |
| | Second series—decrease of erythrocytes | 200,000 |
| Case 9. | First series —increase of erythrocytes | 10,000 |
| | Second series—increase of erythrocytes | 180,000 |
| Case 10. | First series —increase of erythrocytes | 680,000 |
| | Second series—decrease of erythrocytes | 300,000 |
| Case 11. | First series —increase of erythrocytes | 1,000,000 |
| | Second series—increase of erythrocytes | 650,000 |
| Case 12. | First series —increase of erythrocytes | 420,000 |
| | Second series—decrease of erythrocytes | 100,000 |
| Case 13. | First series —increase of erythrocytes | 260,000 |
| | Second series —decrease of erythrocytes | 500,000 |
| Case 14. | First series —increase of erythrocytes | 500,000 |
| | Second series—increase of erythrocytes | 160,000 |
| Case 15. | First series —increase of erythrocytes | 1,220,000 |
| | Second series—increase of erythrocytes | 630,000 |
| Case 16. | First series —decrease of erythrocytes | 320,000 |
| | Second series—decrease of erythrocytes | 300,000 |

In group 1, nine patients show an average increase of 541,000, while the others, two patients, show an average decrease of 520,000 erythrocytes. Group 2 comprises the patients who received two courses of typhoid vaccine. This group contains sixteen patients. Of this number, six show an average increase of erythrocytes of 442,000 following each typhoid course; three had an average decrease of 503,000; seven of the sixteen patients show an increase of 404,000 following one series, an average decrease of 537,000 following the other series.

### CONCLUSIONS

1. Paretic patients improve in general health after a series of typhoid vaccine treatments.
2. There is a group tendency toward an increase of the erythrocyte count during treatments with typhoid vaccine.
3. Any mental changes brought about by the use of typhoid vaccine has not been considered as part of this report.

Kankakee State Hospital.

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## HYPERTENSION: A RATIONAL CONCEPT

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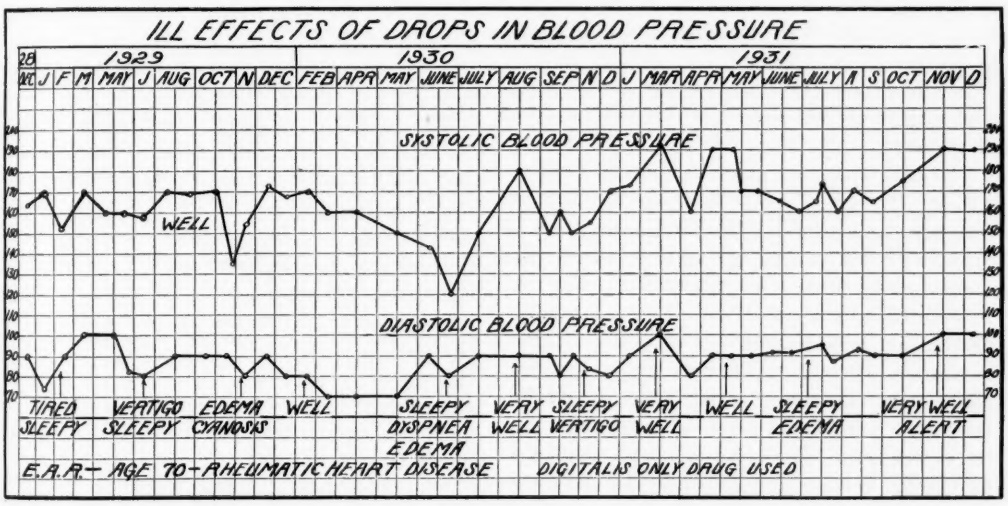
The unorthodox behavior of hypertension has caused the literature to abound with the products of research study and clinical observations on this subject. That few of the conclusions are universally accepted and that many of the seemingly substantial concepts put forth have been subsequently disproven is further evidence of the existing confusion.

The constantly changing picture presented by most sufferers from hypertension defies orderly classification as to the results of treatment, and renders the conclusions formulated open to scepticism in the minds of those who have struggled with this problem. Results of control series are similarly difficult to evaluate because of the spontaneous variability of both the systolic and diastolic pressures, the tendency toward seasonal variations in some individuals and the existence of periods of remis-

sion or intermission in others. Untreated hypertensive patients observed over a period of years show marked spontaneous rises and falls in pressure which are not unlike and frequently are similar to the undulations in pressures which may be observed under any elected form of treatment. The nitrites or similar violent vaso-dilators may be an exception to this statement.

The erratic behavior of blood pressure readings is apparently uninfluenced by the types of hypertension, the age groups or the presence of associated lesions. Individuals with marked generalized arteriosclerosis or with an advanced degree of kidney destruction may be found among those with wide variations in blood pressure. Others less seriously affected from average or mean pressures are more convincing if accompanied by records showing the degree of such variability before and during treatment.

Whatever may be the exact mechanism of the production of hypertension we cannot avoid the conclusion that it is in many instances a compensatory mechanism. That hypertension is a progressive, degenerative disease whether treated or untreated cannot be successfully contradicted. There is no tendency toward self limitation and the condition once inaugurated persists for life although long periods of remission frequently occur. The principle of arbitrarily reducing the blood pressure is no longer tenable and fortunately for the patient, such efforts are usually unavailing.




may present a fixation of the blood pressure although it is rare to find, even in these, a fixation of both the systolic and diastolic elements in the same person. Obviously, single and sporadic blood pressure determinations are unreliable and deductions as to the value of methods of treatment are insecure when readings are obtained at infrequent intervals and for periods of less than one year.

Fluctuations in systolic pressures of 50 to 60 mm are common and may be as great as 100 mm, the average in our experience being in the region of 40 mm of mercury. Variations in the diastolic pressures up to 50 mm. have been observed, the average being 21 mm. Because of this variability factor conclusions drawn

Recognizing the value of maintaining the physiological vascular requirements we view with alarm any fall in the pressure which is not the result of preventive treatment and the accompaniment of other evidence of improvement.

Such a fall frequently presages cardiac decompensation particularly in those older hypertensives with advanced arteriosclerotic heart disease. Disappearance or diminution of a preexisting murmur and a decrease in the quality or intensity of the heart tones accompanying a fall in the systolic pressure in such a patient invariably denotes myocardial failure. Rest in bed and adequate supportive treatment followed by a rise in the blood pressure indicates

a return to successful cardiac function.

It must be conceded that hypertension may become a disturbing factor in the circulation during the time that an effort to compensate is in progress and at such times emergent treatment is in order. Interference with the blood pressure during uncomplicated efforts to compensate may in a nephritic, embarrass his ability to throw off nitrogenous end-products or in arteriosclerotic individuals lead to an actual ischemia of vital organs of the body. Rational systems of treatment must be founded upon a recognition of the existence of these two opposing factors which are often operating simultaneously in the body.

The systolic blood pressure however high, does not indicate the desirability or necessity of effecting a reduction. The symptoms so frequently ascribed to hypertension are found just as frequently in hypertensives during periods of remission and especially during the low level periods in those, subject to an intermittent type of pressure.

The accompanying chart is that of a white woman 72 years of age who has been observed for over three years. The clinical diagnosis is arteriosclerotic heart disease superimposed upon an old rheumatic endocarditis, class 2a. Associated lesions are mitral disease, auricular fibrillation, hypertension and generalized arteriosclerosis. Blood pressure determinations were made on an average of every three weeks for the entire period and no drug other than digitalis was used. Marked subjective sensations of stupor, vertigo and headache accompanied by varying degrees of edema, dyspnea and cyanosis appeared during those periods when the systolic pressure fell below 160 mm. of mercury. These symptoms disappeared and a sense of well-being accompanied rises in the systolic pressure up to 190 mm. Only once during this interval (early in 1932 therefore not shown in this graph) did the above complaints accompany a rise in pressure up to 190 mm. and then were present to a less marked degree. This patient has learned to fear a fall in pressure and associates the above symptoms with that event.

SUMMARY

1. Hypertensive patients show marked spontaneous variations in both the systolic and diastolic pressures.

2. Evaluation of the effects of treatment is difficult because of the erratic behavior of the blood pressure in hypertension.

3. Increases in the systolic pressure are usually compensatory in nature and require no reduction in most instances.

4. Actual danger of tissue ischemia or vascular thrombosis may attend the arbitrary reduction of systolic pressure.

5. The blood pressure record of a patient observed for over three years with the accompanying subjective and objective symptoms is shown.

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## PARATHYROIDISM AND PARATHYROIDECTOMY WITH CASE REPORTS*

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The connection of parathyroidism with osteomalacic conditions has a most interesting history and recently much interest is being manifested. This paper will consist of reports of several cases of parathyroidism with parathyroidectomy, describing their history, blood chemistry and roentgenological studies, which reveal the very interesting picture of parathyroidism. Operation for the investigation of the parathyroids was done with ultimate results, shown by roentgenograms showing recalcification of the bones, with reports of clinical improvements.

The experimental demonstration of the metabolic phenomenon which follows the injection of the parathyroid hormone has resulted in the hitherto unknown clinical entity parathyroidism. The diagnosis of this condition now rests on a secure basis.

The establishment of parathyroidism as a clinical entity amendable to treatment by parathyroidectomy, constitutes a distinct advancement in the fields of both medicine and surgery, and is one of the most important recent contributions of experimentations to clinical medicine.

In this paper the word parathyroidism will be used to replace the word hyperparathyroidism, since we are going to deal with opposing

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symptoms. These opposing symptoms are not simply due to lessened or increased functions of the affected gland, but various clinical states will have to be interpreted as dysfunctions, with mixtures of hyper and hypo elements in the same patient as the name parathyroidism implies.

Case 1. A woman 70 years of age whose history of parathyroidism dates back to March, 1923. Family history reports her mother and three sisters died of tuberculosis. Six children living and well. Personal history. She had the usual children's diseases. Pneumonia twice, the last attack at the age of 41 years. At the age of 48 years was operated on—appendectomy and hysteroctomy, and a cholecystectomy at the age of 53 years. Menses began at the age of 13 years. Periods were regular, normal duration four to five days. No urinary disturbances and bowels always have been regular. Fractured left arm in 1925. Present illness began March, 1923, when she was admitted to Decatur and Macon County Hospital. She first noticed stiffness in the lower extremities, unable to walk, accompanied by excruciating pain in the legs, across lower pelvic region through to the back and severe backache. Six weeks of this suffering was followed by the same symptoms in the upper extremities. She could not bend her arms or fingers. Never in her life had she suffered from anything like this. She was discharged from the hospital with a diagnosis of neuritis. She continued to suffer more or less pain in her limbs, especially in the right upper arm, hand and fingers. This suffering was very intense at times requiring opiates. For the past four or five years she protected her right hand all she could in doing her work and avoided shaking hands, always presenting her left hand which was much less painful. She gradually became noticeably stooped. Her bowels became obstinately constipated. She complained of gastric and colon distress to the point that she was certain she had a malignancy. Pain resulted in a more or less constant state of nervous and physical exhaustion. Lost much sleep. Became discouraged, fearful of becoming a hopeless cripple. Muscles generally hypotonic.

Radiographs taken September, 1931. Lateral spine showed wedging of the 6th, 7th, and 8th dorsal vertebrae with loss of intervertebral spacing, intervertebral disk compression, herniation of nucleus pulposus; diminution of the height of the vertebrae. Dimineralization of the bodies of the vertebrae, ground glass appearance of the vertebrae bodies. Radiographs also showed some hypertrophic arthritis of her lower vertebrae; metastatic calcium deposit. Pelvic bones show marked demineralization. Radiograph of her hand showed osteitis fibrosa cystica spots in the proximal phalanges.

| | | | |
|---|---|---|---|
| Blood calcium and phos., | Sept. 1931— | 14.8 | 3.3 |
| | Oct. 1931— | 14.9 | 3.3 |

Pre-operative diagnosis parathyroidism. Operation, November 12, 1931. Thyroparathyroidectomy right. The right lower parathyroid gland was a true parathyroid adenoma. The left side was investigated and found normal. The pathological report: Specimen consists of a very cellular adenomotous parathyroid tumor 1cm x 1cm x ½cm; microscopically it consists of areas of compact parathyroid tissue with a large diffuse area of alveolar cystic spaces in some of which secondary hemorrhage has occurred; thyroid is diffusely adenomatous. Post operative history: The immediate results were distinct relief from pain, gradual gain in muscle tone and strength. Increased appetite, relief from constipation and abdominal distress. A gain in weight of 15 pounds in a few months. Radiographs taken three and six months after operation showed definite recalcification with resulting restoration of function.

Case 2. Female, aged 64 years. No history of diabetes or hyperthyroidism, and up to 1923 enjoyed exceptional good health.

Present trouble began eight and one-half years ago following a severe attack of influenza and pneumonia. Following the pneumonia she suffered with severe arthritic pains in all her extremities. Pain very severe, muscular weakness, gastric disturbances, total disability. She was treated for articular rheumatism. She lost much weight. Never could gain.

In 1924 she entered the hospital for blood sugar studies and glycosuria and was discharged with a diagnosis of diabetes mellitus. She continued to suffer from her rheumatism and at various times would be a completely bed ridden invalid.

The phalangeal joints of her hands and wrists, elbow and shoulders were ankylotic; pronounced muscular hypertonia. Her chair had to be of a definite height so she could sit down and at the same time be able to stand up herself. She needed to remain in bed one or two days each week to overcome weakness and exhaustion.

Her tonsils were removed in 1926. From a slight fall she had a Colle's fracture in 1928. She was treated for diabetes from 1924 to February, 1931, receiving insulin. Quoting patient, "I had to take small doses as I easily would go into insulin shock."

Patient had a slightly palpable adenomatous goiter. She probably had a low degree of hyperthyroidism with her parathyroidism with no signs of activation, rather an apathetic thyroidism.

From her history she suffered from a toxicity which definitely decreased her tolerance for carbohydrates.

Authorities mention the association of hyperthyroidism and diabetes, and when you remove the toxicity of the goiter you definitely increase the tolerance for carbohydrates. She also was definitely suffering from parathyroidism. Interlocking disorders of other endocrine glands as it were an endocrine imbalance.

In this case the operation thyroparathyroidectomy was done.

Her tolerance for carbohydrates changed to the extent that soon after operation she was sugar free on a regular non-diabetic diet. Gained 15 pounds and was glad to discontinue insulin. It also brings up the question whether she was a true diabetic at all. Sugar tolerance tests on these cases would show a decreased tolerance for carbohydrates, not only caused by hyperthyroidism but by parathyroidism as well. Further glu-

cose tolerance tests will reveal the true picture.

Radiographic report February 2 and 3, 1932: There is evidence of decalcification and some cystic degeneration in the phalanges and metacarpals of the left hand. There is considerable anterior curvature of the thoracic vertebrae and a thinning out or decalcification producing very slight shadows of the vertebrae on the plates. The edges of the vertebrae are shown by very narrow white lines. There is little if any hypertrophic exostosis formation between the vertebrae. The intervertebral discs are compressed and look thinned out.

Laboratory report: high serum calcium and low serum phosphorus.

Preoperative diagnosis, parathyroidism.

Operation February 15, 1932. Thyroparathyroidectomy. Both lobes of thyroid are slightly enlarged and have the appearance of small adenomatous goiter. At the entrance of both lower inferior thyroid arteries parathyroid structures are seen. Left subtotal lobectomy and removal of left lower parathyroid body. Right subtotal thyroid lobectomy. The right lower parathyroid is a more compact body, ovoid. Removed and identified as a true parathyroid adenoma by biopsy. Post operative report: Sleeps uninterruptedly all night without pain since the operation. All movements are much better. Can sit on any chair in the house. Muscles regaining their tone and noticeably overcoming the atrophied state.

Radiographs show progressive recalcification of the bones. She can dress herself, get in and out of the car and attend her church which she was unable to do for eight years. Less forward bending of the back and shoulders. Limbs feel freer, looks younger.

Case 3. Female, 73 years old. Family history negative. Personal history: typhoid in youth. Mother of 8 children. Two children died of tuberculosis. One child only lived two weeks. Was over-weight most of her life. Present trouble seemed to have its beginning 20 years ago. Began suffering intensely in her lower limbs and back, especially while at work. Three years ago she became totally disabled. The last walking was done only by sliding the feet with crutches and canes. She noticed the muscles became progressively weak and pain so marked she became bed ridden two years ago. Marked bending of the spine. Could use her hands part of the time. The osteomalacic process seemed to affect the spinal column and the pelvis. Quoting the patient: "I had to be put on a fracture bed because I had too much pain for anyone to touch me or move me." Kyphosis of severe degree. Stooped over appearance, neck drawn in, shoulders coming forward, lower ribs approaching the iliac spine and a flattened pelvis. She slept much of the time in a sitting posture. She suffered from periodical itching of the skin and thought she had eczema which no doubt was due to the hypercalcemia as well as the cause of the diuresis from which she suffered. She was treated for diabetes. During these attacks of diuresis and skin affections she remembered distinctly as suffering much more severely from pain. Blood serum calcium determinations taken then would have been high and blood serum phosphorus low. Marked atony of her muscles and nerves and a definite facial expression, "Psychic Quietude." Dry skin, senile appearance, deep lines and wrinkles.

Blood chemistry, April, 1931, before operation: Blood serum calcium 12.6. Blood serum phosphorus 3.8.

Radiograph report May 5, 1932, of spine and pelvis.

Lateral view of the thoracic vertebrae shows a marked bending forward of the upper vertebrae with compression of the anterior part of the bodies. There is considerable decalcification of the vertebrae with some lipping of the articular surfaces.

Radiograph of the pelvis shows the entire pelvic bone to be markedly decalcified so that there is very little contrast between the bones and the surrounding tissue. The upper portions of the femurs are also markedly decalcified.

Pre-operative diagnosis, parathyroidism. Operation May 7, 1932. Collar incision, short neck. Both thyroid lobes enlarged and have the appearance of adenomatous goiter. Right subtotal lobectomy taking the tumor of the parathyroid in continuity 1 cm x ½ cm x ½ cm. Left subtotal thyroidectomy and removal of a smaller parathyroid gland.

Pathological report. Specimen consists of a parathyroid adenoma. The cell structure and arrangement is distinctly atypical. The stain is unfortunate and does not bring out the eosinophilic characters of the tissue, so that it is impossible to tell the relation of the "chief" to the oxyphile cells, but my impression is that the chief cells make up the major part of the tumor. There are large numbers of colloid cysts far in excess of the normal number.

Blood chemistry, May 16, 1932: Calcium 9, phos. 2.5.

Post operative period. In the hospital 8 days. Received 20 units of parathormone daily. Much less pain. Was in wheel chair for a short period each day during the last three days in hospital. She was very homesick and left hospital May 16, 1932.

Case 4. 73 years old. Typhoid when a child, no other serious illness. Had 12 children, all living but one. Had left breast removed 28 years ago and at that time had a noticeable goiter. She suffered from palpitation of the heart at various times; was treated for heart disease. Present trouble began a year ago in right hand and right leg. Backache. This suffering was more severe at times with intervals of relief. Marked muscular weakness. Stooping, poor appetite, loss of weight, gastrointestinal distress, dry skin, facial appearance senile, deep lines, "Psychic Quietude."

Blood chemistry April 26, 1932, Cal. 14. Phos. 3.3.

Radiographic report April 26, 1932. Lateral radiograph of the thoracic vertebrae shows some lipping and hypertrophic exostosis in the region of the middle third of the thoracic vertebrae. Some compression and decalcification is to be noted.

Diagnosed parathyroidism. Operation, May 4, 1932.

There are some cystic areas of decalcification in the phalanges and also some areas of marked increase in calcification. Both conditions are to be noted more at the ends of the bones.

Pathological report. Thyroid adenoma with some fibrosis. Thyroid adenoma with edema and necrosis.

Parathyroid tissue is diffusely infiltrated with fat. There are no distinct departures from the normal except that the gland is unusually fatty, but this is a common finding in elderly people. (It should be understood that in parathyroidism there is often no outstanding pathology in the parathyroids.)

Post operative report. Pain much relieved. Increased muscle tonus. Skin moist, calcium normal. Convalescing.

There is a type of actual calcium disturbance which is probably a transitory osteomalacic type that should be treated with Viosterol, ultraviolet rays, calcium, and so on. These cases usually have no elevation of serum calcium. An exact limit between this and permanent parathyroidism cannot be drawn. If in doubt one should treat these patients one or two months and if no improvement takes place or recurrences take place after an amelioration parathyroidectomy should be considered.

As to the arthritic type, parathyroidectomy should only be considered after the acute stage of arthritis has passed for a long time but has led to more or less ankylosis. There also should be some suggestion of hypercalcemia, hypotonia of muscles and some decalcification. This should be termed a parathyroidism, arthritic type. No operating should be done for an active arthritis without such symptoms as mentioned. Standard Life Building.

## DISCUSSION

Dr. Paul Starr, Chicago: Mr. Chairman and Gentlemen: I would like to stress the fact that the discovery of hyperparathyroidism, first reported in this country by Eugene Dubois at Bellevue, opens up the field of calcium physiology which is extremely complex. We must be very careful in approaching the treatment of individual cases to analyze all the factors involved.

There are a great many forces which influence calcium metabolism. First there is deficient intake which has led to a perfectly definite picture of hunger or starvation osteomalacia.

Second, an excessive excretion produced, for instance, by fatty diarrhea as it occurs in sprue.

Third, the draining effect of repeated pregnancies. This brings up an interesting point, namely, that the old operative procedure recommended for the treatment of osteomalacia was ovariectomy; what ovariectomy might have to do with that is hard to see, and yet there is a very definite influence that that would have, since it would prevent further pregnancies and further drain on the maternal organism for calcium, having nothing whatever to do with the fundamental process.

Then, of course, there is fourthly, deficient vitamin D intake, and fifth, deficient phosphorus ingestion. There is a disease in South Africa that is well recognized in cattle, producing bone disease that is due simply to the fact that the terrain on which the cattle feed has a deficient amount of phosphorus in the geological deposits and the grasses and grains of that area do not contain enough phosphorus, leading to a perfectly definite bone disease.

Then we have sixth, hyperparathyroidism, in which we have just begun to take an interest. This condition produces calcium deficiency by increasing calcium excretion.

I tried to collect the clinical data on Dr. Mertz's cases as he was talking. I think that the pathological reports are exceedingly interesting and important.

The first case has a tumor, 1 centimeter in diameter, that seems by report to be a parathyroid adenoma. The blood chemistry before operation was 14 blood calcium and 3.1 blood phosphorus. That does not fit the picture of hyperparathyroidism since the phosphorus should be considerably lower than that. I wish that he had been able to have post-operative blood chemistry values in that case, because the reversal of the blood picture would be much more definite in establishing the diagnosis.

Interesting in that case, and in others that he reports, is the relief of pain following a parathyroidectomy. Bone pain is a definite element of a clinical picture of hyperparathyroidism and is suddenly relieved by parathyroidectomy. On the other hand, we must remember the psychological effect of any operation in changing the entire outlook of the patient and not be confused thereby.

In the second case no blood chemistry figures were given, perhaps by an oversight. It was suggested that they should have a high calcium and a low phosphorus. The association of diabetes and hyperthyroidism in the second case is interesting.

In the third case the blood chemistry before operation was 12.6 which is the upper limit of normal for the blood calcium. I would admit that that is slightly increased. The blood phosphorus, however, was 3.8, which is probably normal. Interestingly enough, after operation the picture does not suggest a change in hyperparathyroidism since the blood calcium is 9, which is normal, and the blood phosphorus has gone down to 2½ instead of increasing as it would if the hyperparathyroidism were relieved.

In the fourth case the preoperative values are 14 for the blood calcium and 3.3 for the blood phosphorus. The blood phosphorus values are exceedingly important in the diagnosis of the disease. Since the most general group, Albright and Bauer, students of Aub, believe that the essential characteristics of the disease of the parathyroid function are its effect on phosphorus and that the calcium effect is entirely secondary; by the use of the parathyroid hormone preparation it can be shown that the first effect of parathyroid hormone is to promote excessive excretion of phosphorus, producing a lower blood phosphorus and the increase in blood calcium values following later as a secondary effect of the excessive phosphorus excretion.

An actual physiologic diagnosis of parathyroidism has not been made in any of Dr. Mertz's cases. These operations do not seem to have been indicated.

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## SOCIETY PROCEEDINGS

### COOK COUNTY

CHICAGO MEDICAL SOCIETY

*Regular Meeting, Wednesday, October 12, 1932*

SYMPOSIUM ON ANEMIA

Anemias in Women of Child Bearing Period.
Charles B. Wright, Minneapolis, Minnesota.

Anemias of Nutritional Disorders.
W. H. Holmes.

Anemia in Children.
H. G. Poncher.

Discussion..... LeRoy Sloan, Wilber Post, R. H. Jaffe, Julius Hess

*Regular Meeting, Wednesday, October 19, 1932*

LAY EDUCATIONAL PROGRAM
PROTECTING THE PUBLIC FROM MEDICAL FRAUDS

Fads, Quackery and Healing.
Morris Fishbein, Editor,
American Medical Association.

Patent Medicines and Panaceas.
A. J. Cramp, Bureau of Investigation,
American Medical Association.

Prosecution of the Quack.
Mr. Charles A. Bellows,
Assistant States Attorney.

*Regular Meeting, Wednesday, October 26, 1932*

Fourth Annual William T. Belfield Lecture

Changing Concepts in the Dietary Treatment of Renal Disease
Solomon Strouse, President
Chicago Society of Internal Medicine

Discussion to be opened by
Wilbur E. Post
Herman L. Kretschmer

### WILLIAMSON COUNTY

The Williamson County Medical Society opened its fall and winter series of meetings September 20, 1932 at the Elks Club in Herrin, Illinois.

The speakers were Doctor Frank Gorham and Doctor Paul Titterington of St. Louis. Doctor Gorham discussed the diagnosis and medical treatment of Peptic Ulcer of the stomach and duodenum. Doctor Titterington discussed the X-Ray diagnosis of Peptic Ulcer, and then discussed the technique of demonstrating certain bones of the face by X-Ray, showing a great many slides of fractures of different bones of the face.

There was an unusually good attendance and a very profitable meeting.

H. A. Felts, *Secretary.*

## Marriages

FRED WILSON GRAHAM, Morris, Ill., to Miss Clara Ellen Russell of Terre Haute, Ind., in Chicago, September 3.

EARL O. LATIMER, Chicago, to Miss Mildred Neal of Rockford, Ill., September 25.

FRED J. STUCKER to Miss Pauline Ford, both of Chicago, September 14.

## Personals

Dr. and Mrs. M. D. Empson, Harco, observed their golden wedding anniversary, October 2.

Dr. Thurman B. Rice, Indianapolis, addressed the Vermilion County Medical Society in Danville, October 4, on bacteriophage.

Dr. Elmer T. Swann was recently awarded the Order of the Purple Heart for meritorious military service in France.

Dr. Gustavus M. Blech has been awarded the diploma and decoration of the ancient Belgian Order of St. George, with the grade of commander.

Dr. James J. Donahue was appointed supervisor of medical and health service in the public schools of East St. Louis, effective September 14.

The Kane County Medical Society was addressed in Elgin, October 5, by Dr. Max Thorek, Chicago, on "Possibilities in the Reconstruction of the Human Form."

Dr. James J. Donahue has assumed his new position as supervisor of medical and health service in the public school system of East St. Louis.

Dr. William G. Turney, Shelbyville, addressed the Shelby County Medical Society, September 23, on diseases of the gallbladder.

Dr. Ellis Fischel, St. Louis, addressed the Alexander-Pulaski County Medical Society, Cairo, September 30, on treatment of cancer.

Dr. Paul R. Cannon gave the presidential address before the Chicago Pathological So-

ciety, October 10, on "New Trends in the Study of Infection and Resistance."

Dr. James H. Hutton, Chicago, addressed the Rock Island County Medical Society, October 11, on "Practical Points in Endocrine Diagnosis and Treatment."

Dr. James G. Carr, Chicago, addressed the McDonough County Medical Society in Macomb, October 11, on diagnosis of cardiac disease.

The Sangamon County Medical Society heard Dr. Harry L. Alexander, St. Louis, September 29, at Springfield, in a talk on arthritis.

Dr. Ernst Gellhorn, from the department of animal biology, University of Oregon, Eugene, has been appointed to a similar position at the University of Illinois College of Medicine.

Dr. Carl A. Hedblom, Chicago, addressed the Adams County Medical Society, Quincy, October 10, on "Diagnosis and Treatment of Pulmonary Abscess and Bronchiectasis."

Drs. Francis L. Lederer and Philip A. Halper, Chicago, addressed the DuPage County Medical Society at Wheaton, September 21, on "Otologic Problems in General Practice" and "Ophthalmologic Problems in General Practice," respectively.

Dr. Henry Close Hesseltine, instructor in obstetrics and gynecology, University of Chicago, won the $100 annual prize of the Central Association of Obstetricians and Gynecologists for the most original work done by a member during the year. His paper dealt with gynecologic fungi infections in diabetic patients.

Dr. Thomas Parran, Jr., commissioner of health for the state of New York, delivered an illustrated lecture on "Syphilis as a Public Health Problem," October 31, at the City Club, under the auspices of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine.

Dr. G. Henry Mundt was elected President of the Association of New York Central Lines Surgeons at the annual meeting in Buffalo, October 14, 1932. The next meeting will be held in Chicago in June, 1933.

Dr. Harry Singer of the Department of Medicine, University of Illinois College of Medicine, talked over the Columbia Broadcasting System on October 7, subject—"Ulcer of the Stomach."

Dr. C. Raimer Smith, formerly Director of Public Health, Decatur, Ill., conducted the sectional meeting on health for the Teachers' Annual Institute of Macon County, held in Decatur, October 13, 14, 15, 1932.

Drs. Thomas P. Foley and J. R. Ballinger gave the program at the October 20 meeting of Livingston County Medical Society, on the subjects, "Pioneering in Financial Prophylaxis" and "Medical-Legal Medicine."

Professor Julius Bauer of the University of Vienna addressed the students of the University of Illinois College of Medicine on the subject of "Constitution in Medicine," on October 8.

Dr. Jesse R. Gerstley was the guest speaker in pediatrics at the Annual Meeting of the Medical Society of the State of Pennsylvania held in Pittsburgh on October 5, 1932.

Dr. Paul S. Carly of the Rockefeller Foundation gave a talk before the Medical History Club of the University of Illinois, October 5, on "Experiences in the Near East and in the American Tropics." Dr. Carly is a graduate of Illinois, 1919, was an Interne and Resident in Cook County Hospital. For the past ten years he has been with the Rockefeller Foundation.

## News Notes

—A new roentgen-ray department occupying ten rooms has recently been installed at the John C. Proctor Hospital, Peoria.

—A bronze memorial tablet was unveiled in the Berwyn Hospital, September 4, commemorating Dr. Arthur MacNeal, whose death occurred, March 13. Dr. MacNeal founded the Berwyn Hospital and practiced in Berwyn for forty years.

Dr. C. Raimer Smith has resigned the position of Health Director of Decatur, Illinois, to enter the private practice of medicine. Resignation became effective October 1, 1932.

—Dr. Fred L. Adair, professor of obstetrics and gynecology, School of Medicine, Division of Biological Sciences, University of Chicago, has been appointed chairman of the department to succeed Dr. Joseph B. DeLee, whose appointment expired October 1. Dr. DeLee, who has been chairman since the founding of the department three years ago, has been appointed chief of the obstetric service in Lying-In Hospital. He will retain his professorship of obstetrics and gynecology. Dr. Adair came to the university in 1929 as professor of obstetrics and gynecology from the University of Minnesota School of Medicine.

—Announcement has been made by the Alexander County Medical Society that a free clinic will be operated by physicians of Cairo and Alexander County for children whose parents are unable to pay for medical services. Under the plan, physicians will give their services free and the Kiwanis and Rotary clubs and other civic organizations will cooperate in supporting the clinic and raising the money to defray the expense of operation. For many years the Rotary and Kiwanis clubs have supported health work among the underprivileged children of Cairo and the county. All cases will be checked to determine that parents are unable to pay and that their children would not otherwise receive help.

—The new La Rabida Jackson Park Sanatorium, where free treatment will be given to children with heart disease, was dedicated, October 18. The new sanatorium, according to newspaper accounts, is a replica of the La Rabida building of the 1893 World's Fair, which was a reproduction of the famous hotel at Palos, Spain, where Columbus planned his voyage leading to the discovery of America. Among the articles placed in the cornerstone by Mrs. Louis T. Orr, president of the sanatorium board, were a list of the donors, year books of the organization, and the first quarter dollar minted in 1932. Speakers included Drs. Robert A. Black, medical director of the sanatorium; Herman N. Bundesen, president of the Chicago Board of Health, and Morris Fishbein, editor of the Journal, A. M. A. The new building cost about $300,000, and has accommodations for 175 children. Thirty were accepted for treatment, October 21.

—An institute for psychoanalysis was opened at 43 East Ohio Street, October 3, with Dr. Franz Alexander as director. Dr. Alexander was formerly associated with the Berlin Psychoanalytic Institute and was visiting professor of psychiatry at the University of Chicago. Dr. Karen Horney, also of the Berlin institute, will be associate director. The objectives of the institute will be to carry on research to study, teach and practice psychoanalysis. A limited number of patients will be accepted whose therapeutic problems coincide with the research aims of the institute. The Chicago institute will be the second of its type in the United States and the first to maintain a full time and staff with fixed salaries. The institute is partially endowed and is incorporated under the laws of Illinois as a nonprofit organization. Mr. Alfred K. Stern, a director of the Julius Rosenwald Fund, is president of the board; Sidney L. Schwarz, a trustee of Michael Reese Hospital, vise president; Dr. Ludvig Hektoen, director, John McCormick Institute for Infectious Diseases, treasurer, and Walter T. Fisher, an attorney, secretary.

—Five illustrated lectures on cancer are announced by the Institute of Medicine of Chicago and the Cancer Research Committee of the Chicago Woman's Club, to be delivered by Dr. Max Cutler, director of the tumor clinic, Michael Reese Hospital. The lectures, planned for physicians, internes, senior medical and dental students, and graduate nurses of Chicago and vicinity, will cover the fields of causation, prevention, early diagnosis and treatment. The material presented will include in chronological order the historical landmarks in the progress of the knowledge of cancer, a description of recently discovered contributing causes, and a review of the modern methods of treatment. Special attention will be directed to the newer developments in the technic of the roentgen-ray and radium, and the results of the modern treatment will be shown. The lectures will be as follows:

November 4: Causes of Cancer and its Prevention.
November 11: Early Diagnosis of Cancer.

November 25: Surgical Treatment of Cancer.
November 28: Radiation Treatment of Cancer.
December 2: Results of the Modern Treatment of Cancer.

—Dr. Paul S. Carly of the Rockefeller Foundation gave a talk before the Medical History Club of the University of Illinois, October 5, on "Experiences in the Near East and in the American Tropics." Dr. Carly is a graduate of Illinois, 1919, was an Interne and Resident in Cook County Hospital. For the past ten years he has been with the Rockefeller Foundation.

—Professor Julius Bauer of the University of Vienna, addressed the students of the University of Illinois College of Medicine on the subject of "Constitution in Medicine," on October 8.

—At its meeting of October 8, the Board of Directors of the American Society for the Control of Cancer took the following action:

"It was voted that the *Bulletin* of the Society be made its official organ and that the present relationship between the Society and the *American Journal of Cancer* be discontinued."

—The Cook County Graduate School of Medicine in affiliation with the Cook County Hospital was incorporated under the laws of Illinois, September 3, as a corporation, not for pecuniary profit. The object is to maintain a graduate medical school for the advancement of medical, surgical and scientific studies and to engage in research. The school will be located in a three-story fireproof building at 427 South Honore Street. It proposes to provide courses in general medicine, surgery and the specialties, to be of such duration and to include such subjects as will best serve to improve the knowledge and practice of regular graduates of recognized schools of medicine. No instruction will be given to persons who are not regularly licensed practioners of medicine from recognized medical schools. The initial aim of the school is to organize and systematize immediately the great facilities offered by the material contained in Cook County Hospital, and by the institution of a teaching unit in the hospital to improve the care of the sick. It is also desired that fellowships may be provided for the study of suitable problems. The faculty will include the staff of Cook County Hospital in all its branches. The administration of the school will be in the hands of a board of trustees, who became the incorporators by reason of the power invested in them by the staff of the hospital: Drs. Philip H. Kreuscher, chairman; Raymond W. McNealy, secretary; Aaron Arkin, Thomas C. Galloway, Richard H. Jaffe, William F. Monerieff, Karl A. Meyer and Frederick Tice, the last two ex officio.

—At a recent meeting in Chicago, the directors of Alpha Omega Alpha Honorary Medical Scholarship Society adopted the following resolutions in recognition of the eminent services of the late Dr. William W. Root, Slaterville Springs, New York, the founder of the society and secretary-treasurer since its organization in 1902:

1. That all stationery and official documents of the society bear the words, "Founded by William W. Root, 1902.", and

2. That the annual lecture presented each year by a leading medical scientist, be known as the "William W. Root Alpha Omega Alpha Lecture."

Mrs. Root will continue as assistant secretary of the Society.

## Deaths

Frank Billings, Chicago; Northwestern University Medical School, 1881; interne in Cook County hospital; demonstrator of anatomy in his alma mater till 1885; after fifteen months of study abroad he demonstrated the new studies in bacteriology; professor of physical diagnosis in Northwestern University Medical School 1886-1891; professor of medicine till 1898; then associate professor of medicine and dean of senior students at Rush. Later, at the request of President Harper he became professor of medicine and dean of the faculty. His death at the age of 78 from a gastric hemorrhage occurred September 20.

President of Chicago Medical Society in 1900 and president of the American Medical Association in 1902, he was the only one to serve two years in that office. Treasurer of the association from 1904 to 1911 and trustee from 1918 to 1924. His presidential address on medical education lead to the establishmen

by the trustees of the Council on Medical Education and Hospitals. He also took an active part in the early work of the Council on Pharmacy and Chemistry.

As a medical organizer he was active in the development of the Chicago Pathological Society, the Chicago Society of Internal Medicine and the Institute of Medicine of Chicago. He was president of the Association of American Physicians in 1906, and, in 1907, of the National Association for the Study and Prevention of Tuberculosis.

Among other institutions established by wealthy patients of Dr. Billings may be mentioned the McCormick Institute for Infectious Diseases, the Durand Hospital, the Otho S. A. Sprague Institute, the University of Chicago School of Medicine with the associated Bobs Roberts Memorial Hospital for Children, the Max Epstein Dispensary, the Albert Billings Hospital, the Frank Billings Clinic, the Billings Library, and the Lasker and the Douglas Smith Foundations for research.

Dr. Billings was a leader in almost every activity concerned with the phenomenal advance of the science and art of medicine during the last fifty years.

John Whiteaker Ballance, Marion, Ill.; Rush Medical College, Chicago, 1896; aged 61; died, September 9, of pulmonary tuberculosis.

Charles John Paul Beirne, Alpha, Ill.; St. Louis College of Physicians and Surgeons, 1902; aged 64; died, September 6, of poison, self administered.

George S. Bolt, Herrick, Ill.; Missouri Medical College, St. Louis, 1883; aged 72; died, October 5, of angina pectoris.

James Howard Burns, Carrollton, Ill.; Eclectic Medical Institute, Cincinnati, 1892; a Fellow, A.M.A. past president of the Greene County Medical Society; served during the World War; aged 64; died September 4, of heart disease.

Thomas Oscar Freeman, Mattoon, Ill.; Baltimore Medical College, 1898; a Fellow, A.M.A. member of the House of Delegates of the American Medical Association, 1916-1917 and 1921-1932; fellow of the American College of Surgeons; formerly member of the state board of health; city health officer; for many years attending physician to the Odd Fellow's Home; one of the organizers and on the staff of the Methodist Memorial Hospital; aged 59; died, October 7, of cerebral hemorrhage.

William S. Gilbert, Wheaton, Ill.; Hahnemann Medical College and Hospital, Chicago, 1893; aged 63; died, August 26, in the Community Hospital, Geneva, of postoperative shock and pyloric obstruction.

Elmer Newton Glascock, Mill Shoals, Ill.; St. Louis University School of Medicine, 1905; aged 52; was found dead in bed, September 26, of heart disease.

William P. Goodsmith, Wilmette, Ill.; Rush Medical College, Chicago, 1883; member of the Illinois State Medical Society; on the staff of the Martha Washington Hospital, Chicago; aged 73; died, October 3, of myocarditis and paralysis agitans.

Charles N. Harrison, Fulton, Ill.; National Medical University, Chicago, 1903; aged 68; died, August 15, of myocarditis.

Austin Montgomery Lindley, Urbana, Ill.; Cincinnati College of Medicine and Surgery, 1880; member of the Illinois State Medical Society; for many years president of the board of health of Urbana; aged 76; died, September 13, of carcinoma of the intestine.

Franklin Albert Martin, Pana, Ill.; Missouri Medical College, St. Louis, 1898; a Fellow, A.M.A. served during the World War; on the staff of the Huber Memorial Hospital; aged 58; died, September 30, of angina pectoris.

William J. McCuaig, Chicago; McGill University Faculty of Medicine, Montreal, Que., Canada, 1886; aged 72; died August 28, in Los Angeles, of chronic valvular heart disease.

James M. Mitchell, Pontiac, Ill.; Rush Medical College, Chicago, 1900; a Fellow, A.M.A. aged 62; died, August 25, of carcinoma of the throat and mouth.

Heliodor Schiller, Chicago; German University of Prague Faculty of Medicine, 1896; a Fellow, A.M.A., fellow of the American College of Surgeons; associate surgeon to the Michael Reese Hospital; aged 61; died, October 20, in St. Therese's Hospital, Waukegan, Ill., of injuries received in an automobile accident.

Edwin A. Streich, Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; a Fellow, A.M.A. on the staff of St. Bernard's Hospital; aged 56; died, August 25, of chronic valvular heart disease.

John L. Sweeney, Chicago; Baltimore University School of Medicine, 1898; a Fellow, A.M.A. aged 65; died, August 26, in the Evangelical Deaconess Hospital, of diabetes mellitus.

Anthony Jacob Tananewicz, Chicago; Chicago College of Medicine and Surgery, 1914; aged 46; was found dead, September 21, of chronic nephritis and cardiac insufficiency.

Theodore Tieken, Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1899; a Fellow, A.M.A. Ingals clinical professor of medicine, Rush Medical College; attending physician to the Cook County Hospital, 1906-1924; attending physician to the Presbysterian Hospital; consulting physician to the Norwegian-American, Washington Boulevard, Durand, Garfield Park and Columbus hospitals; governor of the Institute of Medicine of Chicago; aged 66; died, October 15, of coronary thrombosis.

James Elmer Woelfle, Cairo, Ill.; St. Louis College of Physicians and Surgeons, 1897; member of the Illinois State Medical Society; served during the World War; for many years member of the board of education; aged 60; died, September 9, of angina pectoris.

Ralph Eugene Worrell, Elmwood, Ill.; Northwestern University School of Medicine, Chicago, 1909; aged 52; was killed, August 28, in an automobile accident.

NOV 1 7 1932

Medical Lib

# Illinois Medical Journal

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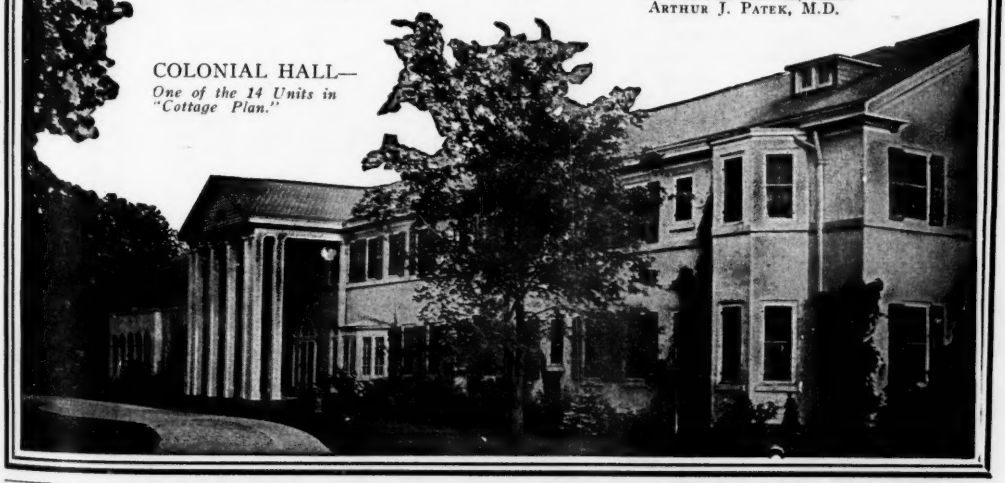

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